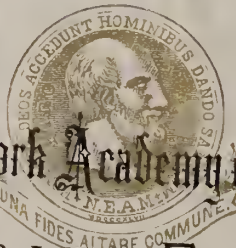


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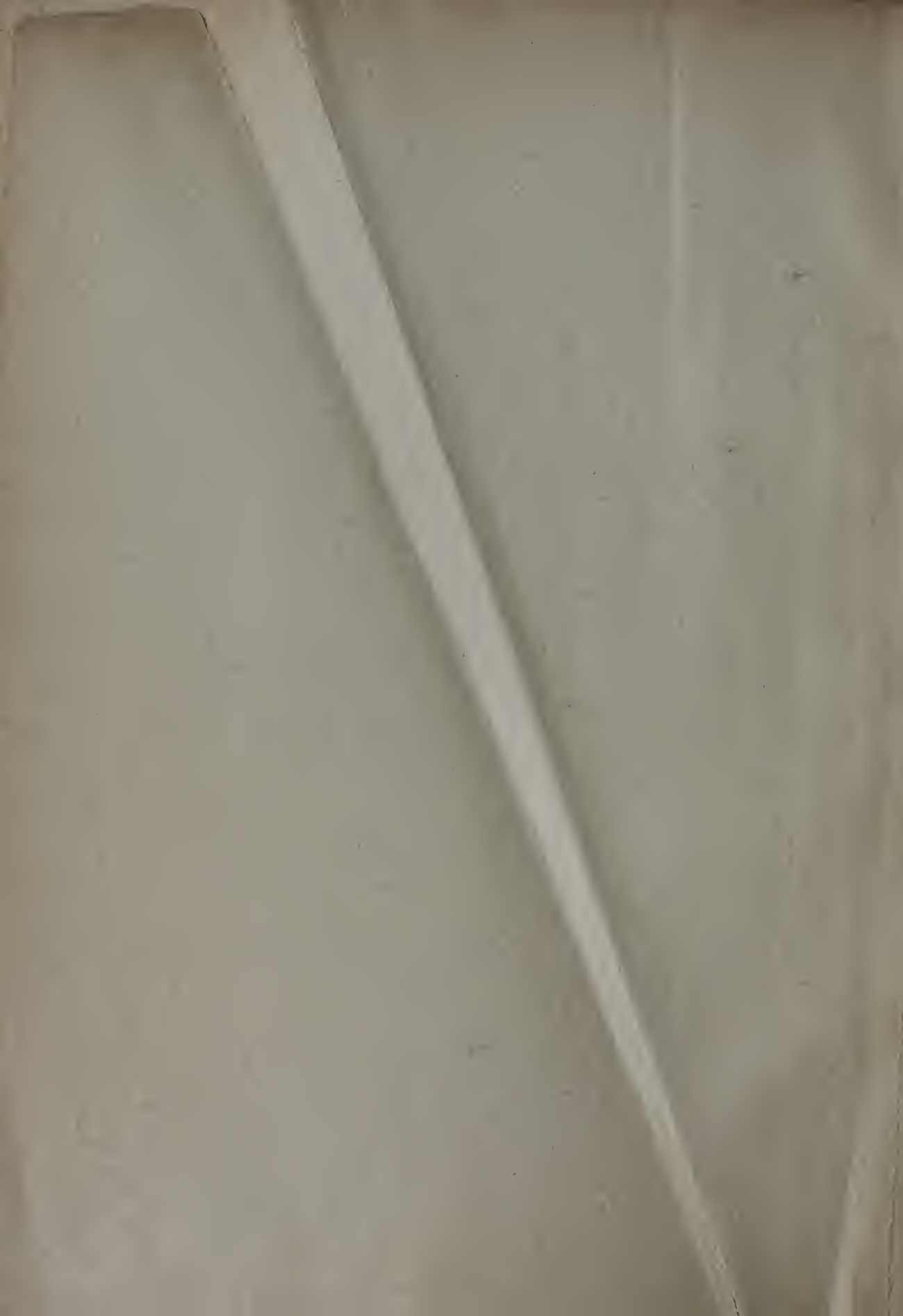
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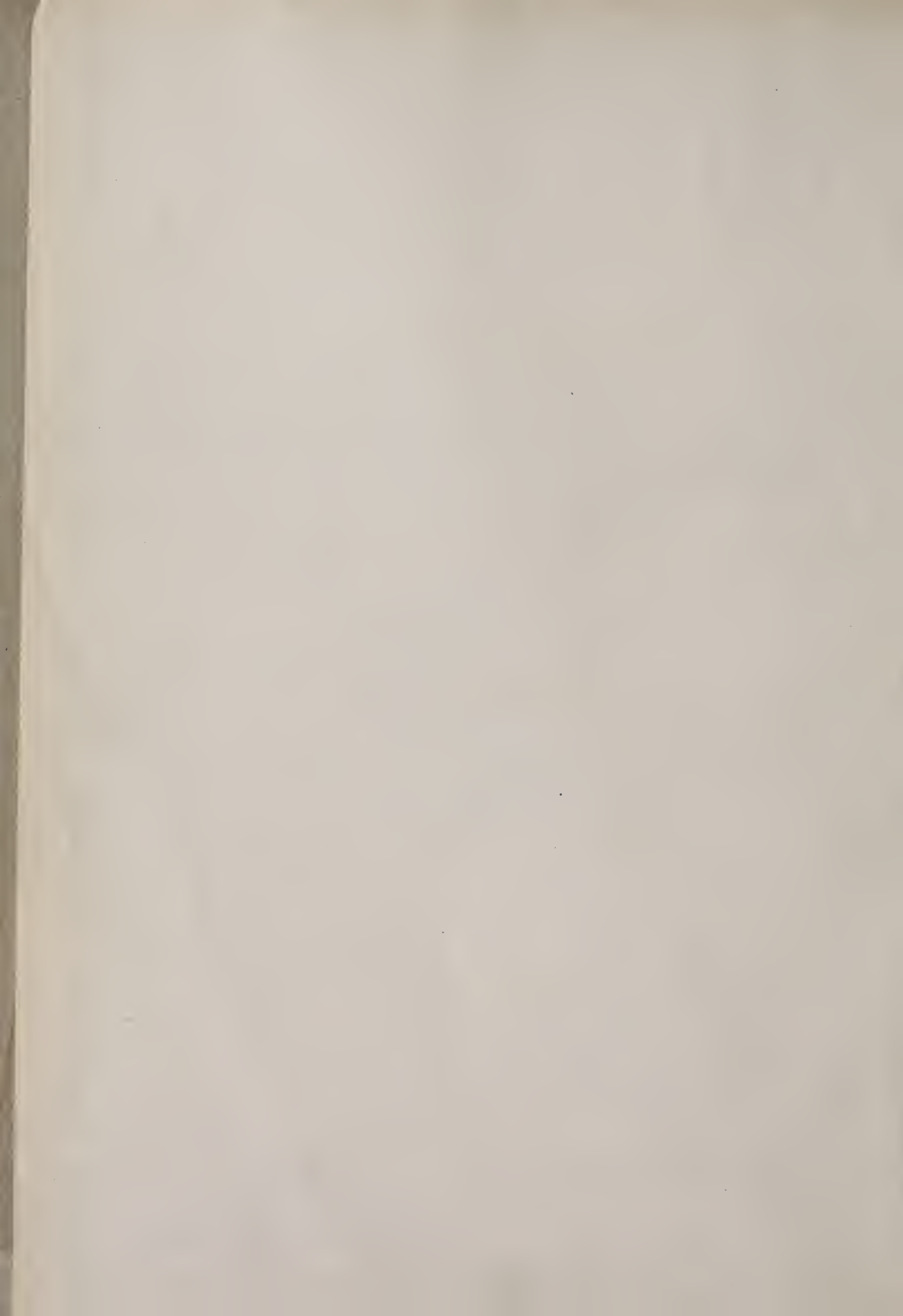
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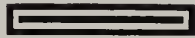




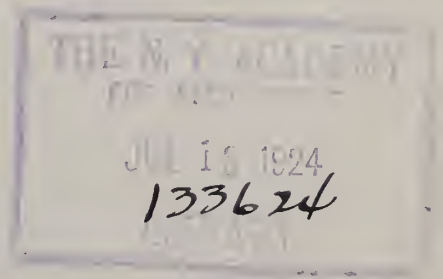


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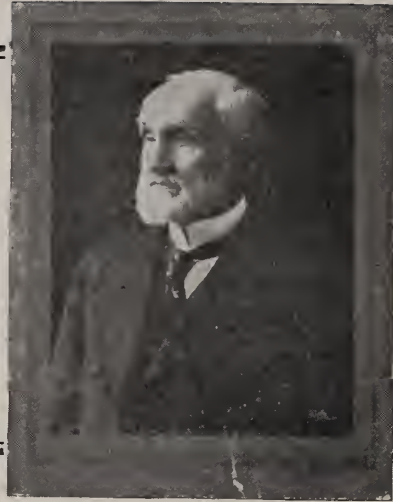
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Original Communications

REMARKS ON TRANSDUODENAL DRAINAGE OF THE GALL TRACT.*

By WALTER B. MARTIN, M. D., Norfolk, Va.

It is my purpose to review my experience in drainage of the gall-bladder by the so-called Lyons' method, and by certain case reports to illustrate the conditions under which non-surgical drainage is indicated, and the benefits that may result.

As is well known, the procedure is based on the assumption that the introduction of a concentrated solution of magnesium sulphate directly into the duodenum through a duodenal tube will result in the relaxation of the sphincter of Oddi with practically simultaneous contraction of the gall-bladder and the free outpouring of bile. Meltzer in 1917 originally noted the action of magnesium sulphate when applied directly to the duodenal mucosa and suggested that its relaxing effect might be utilized clinically in draining the biliary passages. Lyons in a series of papers has outlined a practical method of procedure for non-surgical gall-bladder drainage and has presented weighty evidence as to its value in the diagnosis and treatment of certain biliary conditions.

The method of application is briefly as follows. The patient presents himself in the fasting state. A sterile duodenal tube is passed directly into the stomach and any residual stomach contents is aspirated off. The stomach is then washed thoroughly with an alkaline antiseptic solution; the tube is withdrawn until the tip is just within the cardia: the patient placed on the right side with the hip slightly elevated and allowed to slowly swallow the tube until the desired point is reached. In the great majority of cases no difficulty

is encountered in introducing the tube into the duodenum. In ninety per cent. of my cases this has been accomplished in ten minutes.

After the tube has been satisfactorily adjusted, 30 to 50 c.c. of warm 25-30% solution of magnesium sulphate is introduced through the tube and in about two minutes gentle suction is exerted with a syringe. Usually a small amount of the magnesium sulphate is recovered, followed by a flow of golden yellow bile. Characteristically the three types of bile as described by Lyons can be obtained; viz.: a few c.c. of yellow or brownish colored bile, coming presumably from the common duct, followed by a larger quantity of darker, more viscid and concentrated bile believed by Lyons and others to be the contents of the gall-bladder, and finally, a persistent though much less voluminous flow of thin, light straw colored fluid which is considered to be the freshly secreted bile directly from the liver. This sequence of events can actually be observed by anyone who carefully carries out the procedure. Agreement, however, as to the significance of these changes is lacking.

The recent work of Auster and Crolin would seem to indicate that the gall-bladder has no ejaculatory mechanism and that while circular muscle fibres are contained in the gall-bladder wall, they are not of sufficient strength to bring about expulsion of bile. They found, however, that definite relaxation of Oddi's sphincter and the surrounding duodenal muscles occurs after lavage of the duodenal mucosa with magnesium sulphate. Rous and McMasters have presented evidence of the function of the gall-bladder in concentrating bile, and it is a matter of common observation at the operating table that the gall-bladder bile differs in color and consistency quite strikingly from freshly secreted bile.

If by means of the duodenal tube one obtains a specimen of bile that corresponds in volume to what one might expect to obtain

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from the gall-bladder, that in color, concentration, viscosity, and chemical composition resembles specimens of bile taken at operation directly from the gall-bladder, one is justified in strongly suspecting that this material is gall-bladder bile. This opinion is reinforced by the position of the "B bile" in the sequence. It seems to me a matter of some indifference from the practical standpoint whether the gall-bladder extrudes the bile or whether it is siphoned off. The ability to obtain it is the important point. Work done on lower animals, especially under anaesthetic with the abdominal cavity open, can not well be translated in terms of human physiology. After all, the permanent place that the Lyons' method will occupy in diagnosis and treatment will be based on clinical results; viz.: the number of correct diagnoses made and the relief given to suffering individuals.

In this connection the published clinical records of Cutler and Newton are of interest. While they conclude that the test is not a dependable diagnostic aid, their case records show a coincidence of drainage and operative findings in about 87%. I am not aware of any other procedure that will diagnose as large a percentage of pathological gall-bladders.

Again I wish to emphasize that the question of whether the gall-bladder empties itself through an effort of its own musculature or by some other mechanism is of scientific interest, but has no real bearing on the argument. The question is, can gall-bladder bile be accurately and consistently obtained by means of the duodenal tube? My own experience leads me to believe that this can be done and case records will be presented to show that a flow of bile can be initiated, symptoms relieved, and that a high percentage of drainage and operative findings agree.

What, then, is the field of usefulness of this procedure?

First, diagnosis.

Second, prognosis as to relief by surgical intervention.

Third, treatment.

- a. Simple catarrhal jaundice.
- b. Unsuitable surgical risk.
- c. Mild and early cases of gall-bladder infection.
- d. Typhoid carriers.

The diagnosis of gall-bladder disease is not

always a simple matter. Given digestive disturbance, right upper quadrant pain and tenderness, pain referred to back and shoulder, with or without jaundice, the diagnosis need not be in question, but classical symptoms may be absent or confused by other complicating factors. Association of chronic appendicitis with gall-bladder disease is not uncommon, and the appendiceal symptoms may overshadow the picture. Infection can exist in the gall-bladder practically without symptoms directly referable to that organ. It is in such cases that direct drainage and examination of gall-bladder contents is of especial value. The following cases will illustrate this point.

Mrs. J. M., age 37, seen August 23, 1921, complaining of pain in the left side. General health had been good, nothing noteworthy in past history except an abdominal section at age of seventeen, at which time the appendix and one ovary were removed. In January, 1920, the patient had influenza followed by pneumonia. Since that time she had had severe pain in the left axilla extending into the back. This pain had been almost constant and at times was very severe.

Physical examination revealed a moderately obese woman near middle age. The skin, teeth and mucous membranes were normal. The lungs were normal except for a few fine marginal rales at the left base. The patient complained of pain on deep breathing. There was marked tenderness along the course of the left seventh and eighth intercostal nerves. The heart was normal; pulse 80, regular in force and rhythm; blood pressure 110/70. Liver and spleen not felt, and there was no abdominal tenderness. The extremities and reflexes were normal. X-ray of chest showed no abnormality. Wassermann was negative. Urine was negative except for a faint trace of albumin. Red count and haemoglobin were normal; white count 6,100; 48% polys. 46% small mononuclears. It seemed evident that this patient was suffering with an intercostal neuritis and careful search was made for a focus of infection. The teeth, tonsils, sinuses, kidneys and genitalia were ruled out. As a final measure the gall-bladder was drained and several ounces of thick, turbid, infected bile was obtained. This was followed by complete relief of symptoms. The patient remained free from pain for three weeks. Symptoms returned at the end of that time and she

was again drained with the same result. She was then advised to have the gall-bladder removed, which she refused to do for several months. During this time she came back at intervals for drainage and each time secured relief. The patient finally consented to operation and Dr. C. C. Smith removed a chronically infected, thickened gall-bladder. The patient has now been entirely well for a period of about ten months.

Mrs. G. B. L., age 28, seen March 28, 1922, complaining of stomach trouble. The patient had never been very strong, and had had chronic sinus trouble for several years, tonsils removed in September, 1921. She had double pneumonia following measles three years ago. Following this patient's pulse remained elevated and she had an afternoon temperature for several weeks. She was sent to Catawba at this time but diagnosis of tuberculosis was not definitely confirmed. An abscess at the root of one of her teeth was found and her temperature returned to normal after the removal of this tooth. She had had mild digestive disturbance with tendency to diarrhoea for several years, much more marked during the past six months. During this time she complained of pain in the right upper quadrant of the abdomen, eructation of gas and cardiac palpitation. She had had some nausea and three or four vomiting attacks during the past six months. Recently she had had a burning pain in the abdomen, coming on two or three hours after meals and partly relieved by food. She had been very nervous for several years.

On physical examination the skin was dry, no jaundice, acne papules over the shoulders. Eyes were somewhat prominent, convergence poor, distinct lagging of the lids, moderate fine tremor of the hands, thyroid definitely enlarged. The heart and lungs were normal; pulse rate 104, blood pressure 125/80. There was slight tenderness on deep palpation over the gall-bladder. The uterus was retroverted and the cervix lacerated. Reflexes were normal. The blood picture was normal; no eosinophils were seen in counting two hundred cells. The urine was negative except for trace of albumin. Stomach contents showed a free hydrochloric of 18 and total acidity of 28, no blood, microscopical findings normal. Basal metabolism was plus 40.

Fifty c.c. of very thick, turbid bile were

obtained with the duodenal tube. This material contained many flecks of changed blood and microscopically showed large numbers of free *Giardia intestinalis*. On culture a pure growth of streptococcus was obtained. Cholecystectomy was advised and Dr. R. L. Payne removed a chronically infected gall-bladder. Unfortunately the contents of the gall-bladder were not examined for *Giardia* so cannot say definitely that they were harbored in that organ. Following the operation the patient improved but continued to show cysts in the stools. Later she was given salvarsan intravenously and intraduodenally with apparent eradication of the flagellate. She is now completely relieved of her digestive symptoms and her thyroid condition has also markedly improved.

These two cases have been given in detail. In six other cases that have come to operation, the diagnosis was absolutely confirmed in four. In the fifth case the only pathology was a band of adhesions making an hour-glass constriction about the middle of the gall-bladder. The patient obtained partial but not complete relief by the operation. In the sixth case a diagnosis of chronic gall-bladder and chronic appendicitis was made. The surgeon who operated on this case considered the gall-bladder normal and did not remove it but did remove a chronic appendix. The patient was not relieved by the operation.

The fact that a patient has a diseased gall-bladder is not specific indication that the symptoms complained of are referable to that organ or that they will be relieved by surgical removal. If by non-surgical drainage we can demonstrate definite relief of symptoms, operation can be undertaken with much more assurance of beneficial results. In this connection I wish to again refer to the case of Mrs. J. M. given in detail above. This patient had a severe intercostal neuritis coming on immediately after an attack of pneumonia. Even if a diagnosis of gall-bladder disease had been self-evident in this case, I could not have assured the patient that operation would effect a cure unless I had observed such marked relief after draining her gall-bladder by the Lyons' method. I felt in this case I could positively promise the patient a definite cure if her gall-bladder was removed, and this has been borne out by the subsequent course of events.

One other case is also to the point. This patient is a woman sixty years old who complained of severe pain in her back and in both legs. On getting up in the morning she was very stiff and any movement was extremely painful. Clinical evidence pointed to gall-bladder disease. She had previously been gone over and other foci of infection eliminated, and I advised her to have her gall-bladder removed. She wanted definite assurance that the operation would relieve her. Medical drainage was instituted to test this point. The patient has been completely relieved of the symptoms complained of over a period of several weeks. I now feel that operation in this case gives very definite promise of real benefit to the patient.

Medical drainage of the gall-bladder should supplement but not supplant surgery in the treatment of gall-bladder disease. Given a clear cut case of gall-bladder infection, I would always advise operation if there was not some specific contra-indication.

Lyons reports sixteen cases of catarrhal jaundice, nine of which were treated by the usual expectant method and seven by means of the duodenal tube. The average duration of the first group was thirty-five days, of the second group seventeen days. In other words, the average duration of the disease was shortened fifty per cent. by means of drainage. I have had three cases of what was apparently simple catarrhal jaundice that I have treated by this method. In one case I was entirely unsuccessful in obtaining bile. I felt at the time that I did not get into the duodenum, although this was not checked by fluoroscopic examination. The other two cases responded promptly to treatment.

Mrs. C., a patient of Dr. Roche, gave a history of jaundice that had lasted about two weeks. The stools were apparently acholic, jaundice was very deep, and the patient was suffering from the usual symptoms associated with this condition. Following introduction of the tube and stimulation with magnesium sulphate, a considerable flow of bile was obtained on first examination. Treatment was repeated on several successive days, stools became highly colored, patient's clinical condition improved, she was discharged from the hospital and promptly cleared up her jaundice.

Mr. J. G. H., referred by Dr. Hancock,

with a history of jaundice of two months' duration. The patient had a slight fever at the time of onset of his jaundice, but since that time had been afebrile. He had had no pain but had lost about ten pounds in weight and was suffering with mild digestive disturbance; stools were clay colored. The patient did not appear to be very sick, and his principal objection to the jaundice was that it interfered with his business as a salesman. A small amount of bile was obtained at the first treatment, which was repeated three times. Following the second drainage a very free flow of bile was obtained, stools became dark brown in color, and the jaundice began to rapidly clear up.

I am aware of the fact that any conclusions drawn from the clearing up of catarrhal jaundice are very uncertain because of the fact that these cases run a course that varies greatly in length, and in any given case the clearing may have simply been coincident with the institution of a certain line of treatment and not the result of that treatment. Lyons reduced the average duration of his cases over fifty per cent. by means of the tube, and it is certainly suggestive that in both of these cases noted the jaundice which had been intense and which showed no evidence of clearing, promptly began to clear on institution of drainage.

There are cases that come under observation that need surgical intervention but, on account of the condition of the patient or some associated disease outside of the gall-bladder, operation is inadvisable. These cases can often be relieved and restored to health by means of medical drainage. About ten months ago I saw such a case with Dr. Ashburn. This patient was a man fifty-nine years old who had been deeply jaundiced for a period of three months. When first seen he presented a picture very similar to that seen in advanced carcinoma of the head of the pancreas. The jaundice was maximum. He had lost forty-seven pounds in weight, was having chills and a daily rise of temperature to about 103. History of the case showed that at the time of onset, fever had preceded the jaundice by about two weeks. Five years before he had had a similar attack lasting about one month. The physical examination was essentially negative except the evidence of marked inanition and extreme degree of jaundice. No mass

could be palpated in the abdomen, the liver was slightly enlarged, blood Wassermann was negative, leucocyte count 15,000, urine showed casts and a moderate amount of albumin, and X-ray of the gastro-intestinal tract was negative.

The patient was sent to the hospital and was drained by means of the duodenal tube every other day for two weeks. The first time the tube was introduced into the duodenum, no bile was obtained. On the second occasion, however, a free flow of bile was secured and on every occasion thereafter. Following the second drainage the stools became highly colored, temperature dropped to normal and remained so, leucocyte count returned to normal, and the patient's appetite and general condition began to improve. At the end of two weeks he was discharged from the hospital, having gained five pounds in weight, and feeling much stronger and better in every way. The patient was given a Jutte tube with instructions to drain himself twice a week for four weeks and weekly thereafter for another month. On the outside he rapidly cleared up his remaining jaundice and steadily gained in weight and strength. At the end of two months he had returned to approximately his former weight, and since that time has been actively engaged in his usual business. This man when first seen was extremely ill, he had lost forty-seven pounds in weight and his general condition was very poor. Surgical intervention was out of the question, and I believe that without drainage the patient would have died.

Mrs. E. A. M., age 59, seen January 21, 1922, complaining of shortness of breath and stomach trouble. Her family history and past history were not significant except that patient had had several attacks of upper abdominal pain of no great severity. In the spring of 1921 the patient had a severe cold and cough, and following this ran a low grade temperature for about six months. Since then she had suffered from shortness of breath, fatigue on exertion, and digestive disturbance characterized by gaseous eructation and sourness. Bowels had been loose, with four or five movements each day.

Physical examination showed the skin dry with increased pigmentation, no jaundice. The eyes, ears and nose were normal, the teeth absent, mucous membranes normal. The lungs

were clear except for a few scattered rales at both bases. The transverse diameter of the heart was 16 cm., the point of maximum impulse 11 cm. to the left of the midsternal line in the fifth interspace. The heart sounds were muffled and of poor quality, no murmur detected. Pulse rate 96, regular in force and rhythm. Blood pressure 170/95. There was slight tenderness on palpation in the region of the gall-bladder, abdomen otherwise negative. There was a slight oedema about the ankles. Reflexes were normal. Red blood count 4,150,000; haemoglobin 86%; white blood count 12,000; polys 54.5%, small mononuclears 35.5%; Wassermann negative. Stomach contents, 44 free hydrochloric, total 68, negative for blood, microscopic normal. Stools negative for blood and ova. Urine negative. Drainage of the gall-bladder returned about 100 c.c. of thick, slightly turbid bile containing considerable sediment. Microscopical examination of the sediment showed many pus cells.

In this case we have a patient with a very serious myocardial involvement combined with a fairly active gall-bladder infection. It seemed probable that her cardiac condition was being aggravated by her infection and that to obtain relief, treatment must be directed to her source of infection. She would have been a very poor operative risk and, as she had apparently been benefited by the first drainage, treatment was repeated a number of times over a period of several weeks. This was followed by a fall in the leucocyte count, although it did not return entirely to normal, and quite marked improvement in the patient's condition. Not only were the digestive symptoms ameliorated, but the cardiac condition was greatly helped.

I do not believe that we are yet in a position to make any positive statement as to the permanent results of drainage in treatment of early and mild cases of gall-bladder infection. Certainly there are many cases whose symptoms are not severe and who will not consent to operation. It does not seem unreasonable, in light of the favorable outcome of some severe cases, to believe that many early cases can be cured. If drainage is instituted, foci of infection eliminated, and the general condition of the patient built up, I believe that it is not unlikely that many of these infections can be permanently cured. Demonstra-

tion of this will have to await our future records. I have numerous case records that show relief over a period of many months. With few exceptions these are patients on which surgery has been advised and who have refused operation.

There is one other group of patients that deserves brief mention. That is the typhoid carrier. As is well known, the bacillus typhosus is often harbored in the gall-bladder, and after a case of typhoid fever it may be extremely difficult to rid the stools of the organism. These individuals constitute a constant menace to the community in which they live. Smithies mentions two cases in which he obtained the typhoid bacillus from the bile recovered by means of the duodenal tube. I have had experience with only one case, a patient at the Marine Hospital of this city. This patient had been kept in the hospital for months with constantly positive findings in the stools. Drainage was instituted. We did not recover the bacillus in culture from the bile, but the stools promptly became negative. Three successive cultures were made on the stools with negative results in each case. It is suggested that this method of treatment may be of value in clearing up persistently positive stools.

The cases reported above are not quoted from memory but are abstracts of case records made at the time. They are given in some detail to illustrate the clinical value of the Meltzer-Lyons' procedure. The usefulness of the method as a diagnostic weapon and as a means of determining the probable benefit from surgery has been illustrated. Definite and marked improvement in certain cases treated by this method has been shown. Its possible value in the treatment of mild and early cases and of typhoid carriers has been suggested.

Flatiron Building.

FACTORS OFTEN OVERLOOKED IN THE TREATMENT OF DISEASE.*

By TOM A. WILLIAMS, M. B., C. M., Washington, D. C.

ALL IMPORTANCE OF PROCESS AS COMPARED WITH PRODUCT.

The mere giving of a name to a disorder of a human being is not helpful unless it is accompanied by an understanding of the manner

in which that disorder arises. It is not even enough to know the cause of the disorder unless one knows the process by which the human organ reacts to that cause of disease. For instance, the treatment of a patient is not helped by the mere knowledge that a minute rod like vegetable is the cause of tuberculosis of the lung, unless it is accompanied by the knowledge of the processes which occur in that lung and why they do so. An understanding of this may form the foundation for methods by which we may be able to combat the inconvenience or dangers to life of the disease process, even when we cannot outright and forthwith destroy or neutralize the cause itself.

Diagnosis then must mean not a mere labeling but the comprehension of a process and a name which does not imply this kind of knowledge is more harmful than helpful, for it gives the illusion of knowledge without valid basis. It may produce complacency in the breast of the physician and give satisfaction to the patient's friends, but it is of no value to the patient himself. It is this kind of medical procedure which has given rise to the satires of Moliere, and the diatribes of Bernard Shaw. These strictures are well taken, and it is not by cavilling at them that our profession will help its status, but by taking thought so that these kinds of strictures may cease to find justification.

The factors apt to be overlooked in the treatment of disease mostly depend upon the physician's incomplete conception of the process in the patient's body or mind with which he is dealing, and the incompleteness is very often due to the blinding of the physician's thought by conventional names. This is often the fault of teachers in medical schools, more especially in those men without elasticity of mind whose categories are hard and fast men whose knowledge has been obtained not from nature but from books, which they cannot use wisely, because they have never studied nature enough to know that hard and fast lines are the exception, that academized categories are merely conveniences and that in nature there are infinite gradations and few abrupt differences.

Not only that, but it is not enough to understand the end product in disease processes. That is what we aim to prevent by our therapeutics. It is not helpful to the patient that we are able to detect the mere fact of a con-

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solidated lung, alteration of the heart sounds or rhythm, an exaggerated reflex, hemianopsia, lymphocytosis of the spinal fluid, a diminution of iron or an increase of nitrogen in the blood, albumen or sugar in the urine, a false sense of perception, an exaggerated emotivity or a wrong way of thinking. These are only signs of disease or the result thereof. What interests the therapist is the process which produces these, whether it is a reaction to a microorganism, whether it is a disturbance of metabolism or an endocrine imbalance, or whether it is a disharmony in the integration of the neurones within the body, or whether it deals with adaptations to the surroundings. In all alike the process must be understood. It is not even enough to know the causative agent. For instance, the awfulness of a combatant's life in the recent war does not tell us why a psychoneurosis developed in many men. The knowledge is derived only from the study of the processes occurring in his mind and body. It was only when that understanding was gained by the medical officers that such men could be treated in such a way that they recovered the power of adaptation to the conditions of war.

Again, there is little therapeutic help in the knowledge that once upon-a-time the reaction to a streptococcus injured the mitral valve so as to lead to an incompetence of the patient's heart. Only by the knowledge of the processes concerned in the physiology of the circulation are we able to so order the patient's life that compensation may return.

Our conception of many of the processes occurring in disease is purely inferential and cannot be demonstrated to persons without an extensive knowledge of physiology. Besides, concerning some processes we are still in the dark. In these cases we have to resort to empirical methods and to confess incompetence. However, the number of these has diminished very rapidly as the attention of clinical investigators has become more concentrated upon the study of processes and less absorbed by interest in end results in the post-mortem room and even in primary causes in the bacteriological laboratory.

ATAXIAS DIFFER IN MECHANISM.

For example, the clinical result ataxia is a stage in the progress of a posterior radiculitis which can be readily discerned post-mortem. However, the process which interferes with the

integrity of the roots differs with the cause which has produced it and must be treated in a quite different manner. If the bacillus of Koch is concerned, immobilization of the spine, rest, sunlight, air and generous feeding must be employed. These measures will usually facilitate resolution of the inflammatory exudates, whereupon the roots will again functionate and the ataxia will cease.

On the contrary, when the roots have been affected by the *treponema pallidum*, immobilization will not cut short the pathological processes concerned. But treponemicides will; and, if the process has not gone too far, the cessation of root infiltration will permit root functions to return and the ataxia will cease or improve.

A Government official, age 41, was sent because of a severe ataxia which had lasted less than a month. The man could scarcely cross the room without falling, so great was the stagger. He complained also, of numbness of left foot, abdomen and back, and tiredness on walking, no severe pains, but a dull ache in the back now and then, slight difficulty of micturition also. The patient admitted a chancre five and half years before with sequelae, followed by three years' treatment by mercury pills, without loss of weight.

The present illness had begun with a stiff soreness on front of the right thigh, three weeks before, followed one week later by numbness in the rectum, and soon after this ataxia.

Examination showed lost patellar and achilles reflexes, diminution of the plantar, especially on the left and of the bulbocavernosus. The left pupil was irregular and larger than the right and contracted feebly to light. There was no Romberg, though the patient swayed on walking. Heel to knee test was performed steadily, diadokokinesis was slowed and there was some tongue tremor. No impairment of attitude sense was detected, but deep pain sense was impaired especially on the left, and that to vibration especially on the left. Light touch sense was diminished in the inner border of the feet, especially the right. Wassermann test was positive. The patient was treated by intravenous injection of mercuric chloride, and by salvarsan. One week after treatment the walk was steadier, deep pain sense had returned, vibration sense had improved. One month later the ataxia was only slight and there was no impairment

of sensibility, the blood Wassermann was negative, the right pupil reacted better than before. Two months later the left pupil reacted, the numbness of the abdomen had much diminished, the Wassermann reaction was doubtful, as was the case still one month later. Still later, girdle and leg pains developed but soon ceased. A year after beginning treatment, the Wassermann was negative and the patient, who had been at work all along, walked almost normally, and seemed well except for a drawing now and then in the abdomen and some pain in the arms. Unfortunately the patient ceased attending and repeated efforts failed to trace him. The case is reported to illustrate how rapidly an ataxia may be made to disappear with proper diagnosis and treatment.

A young man who had contracted syphilis only 16½ months before I saw him had been treated once by salvarsan (intramuscular) and by 13¼ grains of protiodide of mercury by the mouth, for a year. In spite of this, headaches ensued fourteen months after exposure. About the same time he showed a marked coarse tremor of the hands, of intentional type; tremor of the tongue and unsteady gait occurred also. Micturition became slow and halting, and erections became ineffectual; poor appetite and constipation; vomiting occasionally occurred; the temperature at times rose to 100. His temper had been irritable.

His physician thought that the tremor might be mercurial, and ceased to give the drug. The headaches and micturitional symptoms improved slightly; but the tremor did not; so a month later, I was asked to advise whether to resume specific treatment or not.

My EXAMINATION showed that the reflexes of the patella were absent with a slight response of the left by reinforcement. Achilles reflexes were active. The radials were doubtful on account of tremor of the arms. The maxillary was faint; plantar flexion was faint. The abdominal and cremaster reflexes were present, but that of the bulbo-cavernosus was absent. Pin prick, touch, cold, vibrations and pressure pain, were felt everywhere except that in the thigh muscles and the right neck and arm deep pain could hardly be elicited.

Motility was not enfeebled; but station was slightly unsteady. He could not stand steady on the right leg and there was a Romberg sign of the left leg. The gait was inco-ordinate and spastic, especially on turning. Heel

and knee test with eyes closed, performed with great tremor. Diakocokinesis much impaired. Finger to finger test showed much coarse tremor. There was coarse tremor of tongue, jaw, face and neck, but not of the trunk. No nystagmus. Passive raising of the leg in recumbency produced an oscillation of 6 to the minute. There was a tremulous speech due to a coarse tremor of tongue; but the lips did not tremble during speech. The laryngeal tone was steady.

The skin was covered with branny scales. The veins of the left fundus oculi were larger and more tortuous than normal.

SUMMARY. A distinctly rubrospinal tremor, loss of the patellar and bulbo-cavernosus reflexes, and loss of pressure pain sense in part of the body, along with the history and micturitional symptoms, indicate lues of the central nervous system, even without Wassermann test or lymphocyte count. The character of the tremor entirely excludes mercury in its causation, for the mercurial tremor is of the toxic type and much finer than the coarse oscillations characteristic of the lesion of the cerebellorubrospinal system, the characters of which are now classical and need not be particularized. The lesions I supposed to be present were (1) an arteritis proliferans of the vessels supplying the rubrospinal system in the midbrain: this was the cause of the tremor; (2) a widespread leptomeningeal specific radiculitis, causing the loss of reflexes and of pressure pain sense.

The TREATMENT recommended was salvarsan, followed by mercury.

The PROGNOSIS given was an arrest of the syphilitic process with a probable diminution of the tremor, possibly sufficient to permit the work of an artist to be resumed.

RESULT: The first dose of salvarsan produced a tremendous diminution of the manual unsteadiness, and the patient began to paint, somewhat tremulously but effectively, in ten days. A second dose, a month later caused a further improvement, so that the tremor is now (two months) hardly perceptible; all the deep reflexes have returned, although that of the right patella is hard to elicit; the deep pain sense is everywhere present, although less easily elicited than normal over the areas impaired. His nutrition is greatly improved; and he has no pain nor any of the spasticity nor inco-ordination formerly present.

ATAXIA FROM POLYNEURITIS.

Again post-mortem examination of an ataxic may reveal intact spinal roots. Then the process at work may be a deterioration of the peripheral nerves themselves, the state known as polyneuritis.

In this case neither rest nor a treponemicide will be efficacious. Only after the regrowth of the deteriorated neurofibrils will the ataxia cease. This can only be effected when the pathogen no longer acts upon the nerves. This must be sought, and, as the case may be, arsenic must be eliminated, alcohol must be abstained from, diphtheritic toxin must be neutralized, or immunity must be established against whatever infection may be at work.

Thus, a woman of 53, wife of a well-known Government official, referred by her physician because her convalescence from diphtheria was complicated by Vincent's angina which she had contracted two months before. There ensued weakness of voice, numbness of feet and thigh and more recently a progressive weakness of the limbs. She was very nervous and was taking osteopathic treatment.

EXAMINATION revealed absence of the triceps, radial, and biceps reflexes as well as a reduction of the patellar, achilles and plantar, while there persisted the deltoid, masseter and abdominal reflexes.

There were subjective tinglings in the extremities and tenderness, both to prick and pressure was increased; the vibration sense was diminished in the leg, arm and trunk; the nerve trunks were tender. The spacing sense was diminished in the left hand, where she could not distinguish two points nine millimeters apart. The localization of touch was almost lost in the toes and ankle, and scarcely perceptible in the hands. The walk was unsteady, the hands unskilful, and the motor power much diminished, yet there was no perceptible atrophy. Both optic disks were slightly pale. There was a slight tachycardia. She was seen several times, during which the symptoms rapidly regressed after the administration of antitoxin which was recommended, so that she was able to go to her new home about six weeks later.

The DIAGNOSIS, of which there was no question, was post-diphtheritic polyneuritis, and the recovery was gratifyingly rapid.

ATAXIA FROM PERNICIOUS ANAEMIA.

It may be still another agency which is pro-

voking the ataxia, and neither the peripheral nerves nor the spinal roots may be at fault. The long tracts in the posterior columns of the spinal cord itself may deteriorate and necessarily ataxia ensues. Pernicious anaemias commonly are accompanied by such medullary deteriorations, and of this ataxia is often a conspicuous sign. This will not be benefited by treponemicides, immobilization, nor by dealing with any known infection. The process could conceivably be arrested if we knew and could deal with the noxa of pernicious anaemia. Concerning this, however, we are still in the dark. But even if we could arrest the process, we could not restore to integrity spinal tracts which had been destroyed, for within the central nervous system regeneration of destroyed fibres does not happen.

ATAXIA FROM NEOPLASM.

Ataxia, however, may arise from still other causes; for instance, the pressure of a neoplasm in the long spinal tracts. None of the afore-mentioned measures of treatment are then to be thought of, but extirpation of the growth must be attempted through surgery or its necrosis by means of radiotherapy may be the preferable method as the case may be.

These five entirely different processes which may produce ataxia are merely mentioned to bring into relief how pernicious it would be to treat this symptom as such; and yet there are very many persons who submit themselves to unjudicious manipulations when they are led to believe that symptoms they suffer are concerned with the spine.

SPINAL MANIPULATORS.

Fortunately, perhaps, most medical men recognize the need of special training in the differentiation of manifestations of nervous disease of this kind and hence they invoke the collaboration of neurologists, but there are a great many medical men who do not realize the importance of doing so quickly. In consequence, many patients invoke the services of spinal manipulators much to their detriment; for these practitioners are quite incapable of a differential diagnosis, which in many cases requires the highest training and judgment. Hence, they treat them nearly all on the basis of a local functional disturbance of the neuro-vascular mechanism, lose valuable time, and sometimes injure the patient. Their continuance in practice is due to the fact that in many

cases of arthralgia, myalgia and neuralgia, manipulation activates the local circulation. This removes discomfort, and, besides this, reflex excitations play a part also; and there are other factors as well, such as suggestion, which need not be particularized here.

FAULTY POSTURE.

Pains in the back or limbs, however, may be purely the product of faulty posture; and it is very unsound to treat them empirically by so-called anti-rheumatic drugs. The rectification of the faulty posture may lead to removal of the pains as in the following case:

A stenographer became progressively weaker and less able to perform her work, which rendered her more and more irritable, and she began to sleep badly mainly because of a gnawing pain in the shoulder and lower neck. Her physician detected no physical signs and treated her by the tonics unfortunately too usual. Examination discovered that the whole syndrome was really secondary to the pain in the neck and that this was due to a faulty stooping posture at the keyboard. A few exercises, with attention to posture at work, removed the pain, and the asthenia ceased for a period of eight years.

DISTINCTION BETWEEN ATAXIA AND TREMOR.

A man of 46, was referred by Dr. W. P. Carr, on account of a shaking of the left arm since four years, and the right hand since November. There are times when he can control the shaking, especially when alone. When under stress, the eyelids twitch also; and when eating, quivering of the abdomen occurs, and he has a sensation of twisting intestines when he lies down. He is worst in the morning. Upon exertion, a severe pain occurs in the right chest and arm since September; it is somewhat relieved by standing.

The previous history is insignificant except where it concerns a pain in the back and "sciatica" after lifting a weight, eighteen years ago. This ceased about three years ago. He is better when starving. The patient gave out an odour I have frequently noted in Parkinson's disease. The teeth had been well attended to.

EXAMINATION showed hyperactive reflexes. Clonus of the left wrist when held in semi-extension, clonus of the left thumb when held in semi-adduction: tremor-clonus of fingers at times when held in semi-extension; pronation clonus at times when the flexi-extensor clonus

diminishes. The left pectorals are rigid, the neck stiffened, the shoulder muscles are semi-rigid; the left arm and wrist show characteristic cogwheel resistance, but there is none elsewhere. A monotonous and deliberate speech he says is the result of his success in curing a stammering which lasted for years. The expression of the face is rather blank. Blood pressure was 136 and 88.

The scanning speech, twittering of the eyes and tremor, gave rise to a suspicion of multiple sclerosis on the part of some who saw him. This opinion could be rejected at once; for the tremor was not intentional, almost ceasing during movement, the eye movements were not nystagmoid, and the speech was not characteristic at all.

The intensity of the tremulousness, its variability, the extraordinary contortion of the eyes and face, the intensity of the effort required to speak when he first entered the room, gave the impression that one might be dealing with a neurotic; but this interpretation was negatived by the blank expression, the regular clonus, and, above all, by the cogwheel resistance of the left arm and wrist, and the board-like hardness of the pectoral and cervical muscles.

The DIAGNOSIS of paralysis agitans was further confirmed by the complete disappearance of the tremor and rigidity when 1/100 of a grain of hyoscine was injected hypodermically.

The patient continues to take hyoscine and is considerably relieved.

DISTINCTION BETWEEN ATAXIA AND WRITER'S CRAMP.

A single woman, aged twenty-nine years, was referred April 10, 1910, by an orthopedic surgeon, after the failure of orthopedics and massage to improve an incapacity to write, apparently due to a painful stiffness and cramp of the shoulder and wrist of two years' duration. Several months in the country had also failed to remedy the cramp, although she had gained ten pounds in weight and become much stronger.

When in the act of writing, the wrist stiffened, the forefinger and thumb tightened up on the pen, the hand trembled, and she complained of severe pain in the wrist and between the first and second metacarpal bones.

Psychologically, she was overconscientious and inclined to melancholy. She was employed as bookkeeper in a railroad office and

upon returning to work, after treatment, she had great difficulty in finishing the day. She felt that this position must be kept, as she could no longer, by singing, earn the money she needed to support herself, as she had formerly done. Against the increasing difficulty of writing her daily quota, she struggled hard; but anxiety only added to the physical burden, and she finally succumbed after trying various methods of holding her pen in the effort to write. This process occupied about six months, and ended in a tremor so violent that she had to be fed. She attributed her incapacity to a broken muscle in the shoulder, and hoped that a month's rest would enable her to return to work. This belief was largely the fruit of medical opinion, showing the need for psychopathological skill in a variety of conditions common in medical practice.

After a month's treatment she greatly improved, but was very pessimistic, and thought she had a tapeworm because of her ravenous appetite.

After the first eight weeks I did not see her so often, and she unfortunately relapsed on account of frequent discussions of her state by well-meaning friends; so that toward the end of July she was firmly impressed with the idea that there was a deformity in the hand and shoulders. This was disproved with some difficulty, as her attitude was distinctly contrary. But after this, she fell back upon the notion that she needed something to make her food assimilate. A re-discussion of her digestive difficulties showed her that they were caused by her emotions.

In spite of all reasoning to the contrary, she declared that she could feel her hand contract sometimes, even when not writing. I decided, therefore, that she had not a real grasp of the principles I had been trying to inculcate. One is apt to fail to carry the patient along in understanding unless the temptation to go rapidly without sounding the patient all the way is not succumbed to. Accordingly, I recapitulated them systematically, with great care, and wrote out a summary for her to take home and study. After her next visit, I kept this, and asked her to write to me an account of the mechanism of her condition as she understood it. From this account it can be seen that she had not even yet transcended the physical explanation, as she referred her condition to disease of the brain cells, fail-

ing entirely to appreciate that her disability was psychological; that is, a disharmony of acts arising in ideas. It was as though on a typewriter neither broken nor worn, one wrote the wrong letters. It would not be possible to overcome the normal acts derived from diseased brain cells by any amount of studied indifference or exercise of self-will, which would serve in a psychological situation.

The patient's own explanation of the mechanism of her affection showed that she had by no means an adequate conception of her own condition; she believed that the brain cells were diseased. As it was necessary for her recovery that she should have a clear understanding, I again tried to place before her that which it was necessary for her to comprehend and to eradicate from her mind her erroneous ideas about herself as follows:

First it is an error to say that your "brain cells have become diseased." There is no disease of your cells, there is a disorder only of the harmony of motion among them in writing, etc. This originated in the extraordinary efforts to accomplish much during a time of fatigue and mental distress. It was the difficulty of doing this which caused the unusual attitude of the hand, which arose from conscious effort to perform what was beyond your staying power. The tightening of the muscles was "mental." The habit of wrong writing was thus engendered and it is this which now persists as an automatism. That is to say, when you are not paying attention, the hand of itself is guided by the mind unconsciously into these perverted positions.

But even when attending, there is an inclination to fall into the very position you desire to avoid. This is partly due to its habitualness and partly to the natural tendency of many persons to perform the very act they most wish to avoid; a familiar example is of the cyclist to collide with the obstruction he sees in the road. By practice, this tendency is soon overcome. So understand that the abnormal acts are not the result of disease of the cells; but are merely bad habits to be overcome in the same way as those of the learning of the piano or of any act needing mechanical dexterity.

It was only after this that rapid improvement occurred and the writing, though a little large, became normal. Perfect ease, however, was not attained, although she did a good

deal of clerical work intermittently, and was ready to take a position demanding it continuously, knowing that if the right hand failed the left hand with which she had learned to write could take its place.

As a result she was one year after, in better physical condition than she had been in for years, and was able to walk long distances and to do hard housework without fatigue; whereas formerly she was tired out by walking a few squares or by any hard work. But that the restoration of her physical health was not the cause of her partial recovery from writing cramp is proved by the relapse of the latter, in spite of continued improvement of her physique. This relapse was due to circumstances which compelled the cessation of the re-educative training. The patient, however, has remained for ten years in important clerical positions.

WRITER'S CRAMP DUE TO APPREHENSION.

A man, referred by Dr. Williams, of Boston, had been unable for one month to write his name clearly on account of a tremor. We know tremor is a symptom of toxemia or of nervous disease; but this man could draw without trembling, which he could not do if his neurones were diseased or intoxicated, so we concluded that his tremor was psychogenetic. On investigation we found that the first time he trembled was when he returned to work after a surgical operation before he was fit. The bank did not recognize his signature, and apprehension of this caused him to tremble thereafter when attempting to write. Re-education led to his cure in a month after one visit.

The role of mental prepossession inhibiting the due co-ordination of muscular movements was explained to him and illustrated by means of the strokes in lawn tennis, more especially that known as the drive. It was shown that fear of making an improper stroke is very likely to lead to lack of freedom and cramping of the muscles, which are the very positions to be avoided. Still greater anxiety will create an uncertain, wobbling stroke, the in-co-ordination of which is comparable to his writing.

The relation of these facts to the episode of the refused check was discussed with him at length. When he had clearly realized the psychological mechanism of his condition, he was directed to entirely cease writing with

purpose, and to begin exercise with free-arm movements with chalk on a blackboard, not paying attention to the forms he drew, but concentrating upon the attainment of freedom in action. When this was insured, he might pass to a slate, and later to pencil and paper, and gradually reduce the size of the writing. But over two years later, he sent me a specimen and informed me that he had almost entirely recovered after one month of the exercise prescribed. (*N. Y. Med. Jour.*, March, 1911).

SO-CALLED NEURASTHENIA AND DEPRESSIONS REQUIRE DIFFERENTIATION.

The oversight of innumerable important factors in the treatment of disease has been conducted to by the concept of neurasthenia as an individual disease to be dealt with by a routine method. It is true that the routine used, the Weir Mitchell treatment, fitted a large number of persons diagnosed under the caption of neurasthenia. But the routine failed to benefit thousands in whom a more careful study of the body processes did lead to measures which benefited them. Besides, the "cure" was highly detrimental to many. In some cases isolation should never have been imposed; in others the forced feeding was a mistake; to others the expense was a handicap to the conservation of their energies.

TONICS.

But if now-a-days an indiscriminate "rest cure" is condemned in this way, how can strong enough censure be inflicted upon the common practice of prescribing "tonics" to persons who are supposed to be run down, without even a proper search for the process responsible for the symptoms? If lassitude is complained of, strychnine is given irrespective of the cause, although the patient may be infected, or ill-nourished or over-nourished, or depleted by anxiety or insomnia, or over-exertion or disturbance of the internal secretions. Although perhaps no permanent harm may be done except in cases of cardiac enfeeblement, yet time is lost, money wasted, and we as a profession are failing in our function.

To patients described as DEPRESSED the same remarks apply, but here the danger is greater, for the term depression is used in several senses quite different in kind. It has been applied to patients who are merely asthenic as well as to persons who show themselves in-

tellectually below par. The term had better be restricted to cases of sadness, despondency, affective distress, or be given up altogether. To give strychnine or other tonics to such patients is to overlook entirely the essential features of the condition, for strychnine is merely an activator of the cells of the spinal cord. Affective depression may arise from hepatic inadequacy, infection, endocrin imbalance, or from psychic causes purely. It is the cause that must be dealt with then.

DIS-ADAPTATIONS MUST BE DISTINGUISHED.

In the psychogenetic cases, equally unscientific measures are often attempted, as, for instance, crude distractions by amusement or change of scene. The proper therapeutics is the penetration into the psychic process which has eventuated in pejorative thinking. This is the preliminary step towards a reordering of the mental attitude of the patient into a truer appreciation of the circumstances which have hitherto distorted his thinking into sadness.

Treatment may demand a readjustment of his whole life which will make him both happier and more efficient as in the following case:

A woman of 26, was referred by a physician who had unsuccessfully treated her several months. She was very reticent in disclosing her complete story with much difficulty and trepidation. She was eating her heart out in routine work in which she was neither using her college education, nor satisfying her craving for contact with other human beings. Nor did her leisure afford her the kind of companionship she longed for. She did not know how to reach away from the safe monotony of a sheltered life into the adventurous variety of the constructive idealism which she worshipped. She was immensely handicapped by a lack of ease of manner and charm, which she envied in others; she was ashamed of her awkwardness.

This situation might only too readily have been attributed to the humiliation she felt at the intense and facile stimulability of her physical sexuality, and a prolonged analytic search might have proved too strong a temptation to those psychopathologists who can think only conventionally.

But as insistent as were the physical discomforts of the patient, I considered that the psycho-social problem was even more important and that to solve this a change of environ-

ment was imperative. It should not need to be said that explanations as to the significance of reproductive physiology were given and that these were of great comfort to the patient. Although they scarcely affected the phenomena themselves, they altered many of the psychological consequences. The patient was assisted to take steps to prepare for an occupation which would favor human contact in constructive work, in which she is now a year and a half later happily engaged without supervision.

MORTIFICATION.

Many of the situations which have been invoked in support of the sexual origin of the psychoneuroses are in reality issues depending upon mortifications. But the inhibitions of personality produced by mortifying experiences or the dream of them occur even perhaps more frequently regarding social intromissions of kinds other than sexual. The conventions of fashion are a particularly frequent source of these. In young people the ethics of sport furnish occasions. Relationships in business are another source where motivation by fear of mortification plays a strong part. This is particularly true with hierarchical organized services such as the Army. It is most true of all perhaps in that form of activity among women under the misappellation of society which has become an occupation to which great devotion is paid.

This is no novelty, it having been expressed over two hundred years ago by John Locke, in a principle which he called the association of ideas, but which had already been observed by Aristotle and considerably developed by Thomas Hobbes when he says, "Not every thought to every thought succeeds indifferently, but as water on a plane table is drawn which way any one part is guided by the finger." He gives the famous example:

"What could seem more impertinent in the discourse of our present civil war than to ask what is the value of a Roman penny? Yet thought of the war introduced the thought of King Charles to his enemies; that brought the thought of the delivering up of Christ; that the thought of thirty pence. Thence easily followed that malicious question."

OTHER INSTANCES WHERE SEX PLAYED A PART.

Better adjustment and greatly improved physical health occurred when a truer perspective was acquired by a patient through the

learning of the great importance of her feeling of resentment, more especially during the inception of her disadaptation in childhood, and after constructive activities were fomented.

Impotence from diffidence grounded in misinformation. In the case of a man sent by a genito-urinary specialist because of an impotence in view of which he was afraid to marry, an undue emphasis upon the physical sexual had caused him to lose perspective, and rendered him almost hypochondriac, as is so often the case. When a new setting of his mind was given him by a dispassionate presentation of the whole sexual relation, his difficulties were enormously mitigated in only a few days. For the efficient factor in his disability proved to be diffidence, which is not sexual at all.

Craving for security and for fulfilment in another patient, the over emphasis upon the sexual factor, almost paralyzed the efforts of some of those who had been dealing with her in fear of what is termed by some "the transference." As a matter of fact an affection which seemed inordinate, and wore a carnal mask, was in reality a craving for protection, safety and trust.

INSOMNIA AND HYPNOTICS.

Grave and often permanent harm does come from the practice of prescribing for a symptom without understanding the process which is responsible for it. When insomnia is complained of, the immediate giving of a hypnotic is all too frequent. Now insomnia is always an expression of disease of mind or body. Sleep being an imperative function, anything which interferes with it must be regarded as quite serious. The morbid process which disturbs sleep is in no way combated by a hypnotic. Hence, the physician's first duty to an insomniac is not to club him into unconsciousness with a narcotic but to ascertain what is disturbing the cerebrum. Even when this cannot be exactly found it is usually possible to differentiate between such causes as infection, intoxication, nerve irritation and psychic pre-occupation. Even when the former causes cannot be immediately removed, calm if not sleep can be more safely induced by hydrotherapy than by narcotics. It is very rare that proper attention to ingestion and excretion along with the removal of minor irritants to the skin, mucous membranes and special senses will not

induce sleep when the exciting cause is not psychological.

In the latter case, which is perhaps more frequent than is commonly supposed, the appropriate psychotherapy should be almost invariably successful. A most instructive case of this kind was published in the *Virginia Medical Monthly* in 1913.

A CASE ILLUSTRATING THE MECHANISM OF TIC AND INSOMNIA BY SUGGESTION.

A child seen with Dr. Perrie, of McKendree, Md., had a series of tics of smacking the lips, bending down, touching the floor resulting from her desire to avoid hurting others with her breath, which she believed was noxious, and to avoid hurting the floor with her heels.

Therefore, she applied the "healing kiss" to the air which she expired, and the "healing touch" to the floor. After these had been removed in a sanitarium, she was thought to be too nervous for school, especially as she could not sleep for hours after her mother attempted to teach her. In reality this child was not "nervous" at all.

She was neither apprehensive, nor fidgety, nor irritable, nor of a difficult temperament. She had stayed awake by suggestion, because her parents had let her see that they were afraid of it. The matter was explained to the parents, and the child has attended school and remained perfectly well. (See *Am. J. Med Sci.*, Oct., 1912.)

CONCLUSION.

Thus these few examples have shown how important for therapeutics is the understanding by the physician of the process which causes the disease of the patient. This is equally true whether the causation is physical or psychological. Thus, faulty co-ordination due to the process of infiltration of spinal roots is rectified by arsenicals and mercurials only when the reaction to treponemata is in activity. Faulty co-ordination due to infiltration in reaction to the bacillus of Koch is removed only when the immunizing of the locality is augmented. Faulty co-ordination due to a process of nerve degeneration ceases only when the nerve elements are permitted to regrow through removal of the responsible toxin. Faulty co-ordination due to a necrotic process in the spinal cord is without present remedy when due to pernicious anaemia. When due merely to the pressure of a new growth, the

process may be arrested by removal of that growth if destruction of the responsible tracts has not occurred.

The inco-ordination of tremulousness when due to a process of ingravescent abiotrophy or slow destruction of the tonus-regulating mechanism in the brain stem or basal ganglia may only be palliated. But when the process which induces tremor is a dynamic response to a situation, known as emotion, it can be completely abolished by proper dealing with the psychological processes of the patient, whereby his conception of the situation is changed.

A depressed patient may be pricked into responsiveness for a time, but he is only truly helped by the removal of the cause of depression, which may come with the understanding of the process which produces it, whether infection, intoxication, endocrin deficiency or a mental attitude.

An insomniac may be clubbed into unconsciousness by a narcotic, which in no wise alleviates the process or eliminates the cause thereof which is responsible for insomnia. This may be a metabolic disturbance, a lesion of structure, or the kind of dynamic process we call psychological. By proper discrimination among these we usually are able to modify the processes disturbing proper function, and when that is done insomnia spontaneously ceases.

These principles are not only true of the few examples above cited, but apply to the whole sphere of medicine. Indeed they are an induction from the whole field of human experience and are known to every thinking individual. However, there need be no apology for their explicit statement; for alas! they are too often forgotten in a short-sighted attention to details, a human weakness from which the medical profession has acquired no special exemption.

1746 K Street.

THE EARLY RECOGNITION OF GALL BLADDER DISEASE.*

By E. L. KENDIG, M. D., Victoria, Va.

One year ago my subject before this Society was the early recognition of Acute Appendicitis. On account of its frequency and dangers, appendicitis has long occupied the first and most important place in abdominal dis-

eases. Today this place is being rivaled by diseases of the gall-bladder. The recognition of gall-bladder disease is important alike to the general practitioner, the internist and the surgeon. Because of the uncertainties of diagnosis before exploration, this region has been called the romantic area of the abdomen. In choosing the early recognition of gall-bladder disease for discussion at this time, I fully realize that it is much easier to discuss its early diagnosis than it is to make it.

The gall-bladder acts as a reservoir for bile. Whether such a reservoir is necessary or not, there seems to be some doubt. McMasters relates that gall-bladders are normally found in some animals and not in others. He gives a long list of those having gall-bladders and those of somewhat similar species not having this organ. As an example, a mouse has a gall-bladder and a rat has none. Woods Hutchinson says that one giraffe may have a gall-bladder and another may not. Man normally has a gall-bladder and, after cholecystectomy, he has none. All seem to get on quite well, with or without. Although there is a doubt as to the real necessity for the gall-bladder, it has the function of storing up bile, and regulating its flow into the intestines. It is only after the gall-bladder has become diseased that it causes trouble. Gall-bladder disease usually has its origin in an infection, although gall-stone formation in some instances is attributed to a faulty cholesterol metabolism. This infection is caused by a similar infection in another part of the body, and reaches the gall-bladder either through the blood stream, through the bile from the liver above, or through the common and cystic ducts from the intestines below. Rosenow demonstrated that the most usual course is through the blood stream. Observations of different investigators vary slightly as to the types of bacterial infection found in the different series of gall-bladder cases reported, but all agree that the streptococci are the chief offenders. Brown reports that in a series of cases examined, showing bacterial infection, more than half were caused by streptococci. It must be remembered, however, that cases of long standing with definite pathological changes may become sterile and fail to show the presence of the causative microorganism.

In order to weigh properly the manifestations of gall-bladder disease, consideration

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should be given to the stage and virulency of the infection and the pathological changes, which have taken place in the gall-bladder region. The infection gives rise to a cholecystitis. As a result of the infection, the bile becomes thicker and more viscid and may contain bacteria, pus, blood, epithelium and cholesterin crystals. Later, gall-stones may develop. The mucous membrane of the gall-bladder becomes redder, granular and often ulcerated. The gall-bladder wall grows thicker and sometimes fibrous. These changes in the gall-bladder wall may cause a contraction of the organ, and render palpation of the gall-bladder impossible. The regional lymphatic glands, situated along the course of the cystic and common ducts, may become enlarged. The peritoneal surface of the gall-bladder may, as a result of the infection, become adherent to the pyloric end of the stomach, the duodenum, or the hepatic flexure of the colon. The grade of the infection is usually mild with recurring exacerbations. A virulent infection or empyema of the gall-bladder may develop. The cholecystitis may become complicated with gall-stones or a stone may become lodged in the cystic or common duct with partial or complete obstruction. According to Graham, 87% of all cases of cholecystitis are accompanied by inflammatory changes in the parenchyma of the liver, which may vary from an infiltration of small round cells to a necrosis with fatty infiltration. Wilensby stresses the point that a gall-bladder infection may cause a swelling of the head of the pancreas, due to a hemorrhagic pancreatitis. McEachern claims that the pancreas was involved in 36% of a series of cases of cholecystitis, reported by him. In the recognition of gall-bladder disease, dependence is mainly placed on the history, physical examination, laboratory reports and the use of the X-ray.

HISTORY. The colonization of bacteria is made easier by stasis of the bile. For this reason, gall-bladder disease is usually found in middle life, more often in women than in men, more often in those who lead a sedentary life than in the active, more often in the fat than in the thin, and more often in those who over-indulge in rich foods than in those who do not. Smithies in a report of 1000 cases showed a relationship between gall-bladder infections and the following diseases: Typhoid fever 20.6%, measles 18%, chronic tonsillitis 14.6%,

scarlet fever 14.5%, pneumonia 11.5%, infected teeth 9.3%, chronic rheumatism 9.2%, malaria 8.7%, whooping cough 7.5%, la grippe 6.6%, mumps 6.2%, diphtheria 4.7%, chickenpox 4.7%, chronic sore throat 4.6%, and chronic bronchitis 2%.

The history of the condition itself is the most important study in making a diagnosis. The different types of gall-bladder diseases can usually be classified under one of the classes advocated by Cheney. I believe that class one should include the early stage of the disease and class four the later stage. For this reason I have reversed the order of his classification.

Class I. The patient exhibits symptoms of chronic stomach trouble with no history pointing to the gall-bladder for long periods of time. Frequently these cases go unrecognized until biliary colic develops or an exploratory operation is performed. Recent methods of duodenal drainage and examination of the fasting stomach render an early diagnosis in these cases more possible.

Class II. The patient exhibits symptoms of a chronic stomach trouble with subacute gall-bladder attacks. Here are found the digestive disturbances coupled with a periodic fullness or soreness on the right side. These attacks are known by the laity as bilious spells and are ordinarily relieved for the time by calomel and salts.

Class III. The patient gives a history of recurring attacks of mild biliary colic with more or less constant indigestion between. In these cases the stomach disturbance will overshadow the mild attacks of biliary colic, and the patient will overlook telling about the colic unless questioned on this point.

Class IV. The patient gives a history of recurring attacks of biliary colic with good health between. Here the typical biliary colic is easy to recognize. However, the pain may radiate or the other symptoms may vary. A diagnosis in these atypical cases can usually be made without difficulty if the main features of biliary colic are borne in mind, such as the sudden onset, the severity of the suffering, the site of the pain, and the unexpected repetition of an attack after an interval of good health.

These constitute a majority of gall-bladder pictures, but there may be certain complications. Should the attack become rapidly more

severe, with rapid pulse, chills and fever, there is probably a more virulent infection or empyema of the gall-bladder. If complicated with the periodic colic, the case should develop chills, fever and paroxysmal sweats, resembling malaria, a stone is probably lodged in the common duct. A tumor of the gall-bladder indicates an inflammatory obstruction of the cystic duct, a stone in the cystic duct or a cancer of the gall-bladder.

PHYSICAL EXAMINATION. The value of physical examination is not as great as would be expected. In a large number of cases of chronic cholecystitis, the gall-bladder is shrunk and palpation of the organ is out of the question. The Murphy sign, or tenderness on pressure over the tip of the ninth costal cartilage on deep inspiration in a sitting posture, is a good sign but not conclusive. A general tenderness over the gall-bladder area is suggestive, but a diagnosis cannot be made from this without good corroborative evidence. Just after an acute exacerbation, a rigidity and increased resistance may be detected over the gall-bladder region by a comparison with the opposite side. A tumor in this region, due either to obstruction or cancer, may be readily palpated.

LABORATORY METHODS. An examination of the stomach contents will help rule out intragastric disorders. The presence of bile in the fasting stomach is strongly suggestive of gall-bladder disease. Achylia gastrica is more often associated with gall-bladder disease than any other extragastric disorder. Sailer found that 22% of all cases of achylia gastrica examined by him in a series of cases were due to gall-bladder disease. The Lyon method of non-surgical drainage of the gall-bladder has promise as a means of diagnosis. Examine the A, B and C bile for red blood cells, pus cells, epithelium, microorganisms and cholesterol crystals. Their presence strongly suggests gall-bladder disease. There is some doubt as to the bile coming from the gall-bladder, yet the method as a whole, in the opinion of some men who have used it a great deal, is valuable in diagnosis and has some merit in the treatment of catarrhal jaundice and mild cases of cholecystitis. Auster and Crohn report in September of this year the result of experimentation on dogs in an effort to test the Meltzer-Lyon theory of "contrary innervation." They injected a stain into the dog gall-blad-

der and applied the magnesium sulphate solution to the duodenal mucosa and papilla of Vater. Although a stimulation of flow of bile into the duodenum was caused, no evidence of the stained bile from the gall-bladder was seen. In our laboratory at Victoria, we had the same result with a little different technique, this work having been done in June and July before the appearance of the Auster and Crohn notes. We were doing some intestinal surgery on dogs whose owners gave them away rather than pay the license tax. On a series of twelve dogs, we decided to test the effect of magnesium sulphate in the duodenum first, before using the dog for anything else. We injected the magnesium sulphate into the duodenum with a large hypodermic syringe and a methylene blue stain at same time into the gall-bladder. The flow of bile was observed, but there appeared no evidence of the stained bile from the gall-bladder in any case. We simply report this as corroborative of the work of Auster and Crohn.

The examination of the feces will rule out intestinal parasites. The discovery of gallstones in the feces is positive, but a search to determine their presence for diagnosis is too uncertain.

An examination of the urine is useful to ascertain mild jaundice and help eliminate kidney disease.

A leucocytosis is present in gall-bladder disease according to the nature and virulency of the infection.

Syphilis of the liver may closely simulate gall-bladder disease and for that reason a Wassermann should be done on every doubtful case.

THE X-RAY. The use of the X-ray is valuable, but this is not conclusive. The findings should be taken into consideration with the other methods of examination. X-ray may in some cases show stones, or changes in the bladder wall, but more often it does not. The X-ray may show the effects of a pericholecystitis, such as flattening of the duodenal cap, reversed duodenal peristalsis, displacement of the stomach to the right, or a high fixed position of the hepatic flexure of the colon. These latter findings may, however, be produced by a localized peritonitis due to disease of the pylorus, duodenum or colon, and it is necessary to establish negative findings in these

organs before ascribing the symptoms to gall-bladder disease.

The differential diagnosis between cancer and gall-bladder infection is difficult in the early stages. Ochsner says, until a firm tumor is detected in the gall-bladder region, there may be nothing to make a diagnosis of cancer in this region certain. Cheney declares that the inference usually suggests the diagnosis, but exploratory operation is required to prove it. Sooner or later cancer will obstruct the common duct and produce jaundice. Here Lyons' method of non-surgical drainage may be used to determine the presence of catarrhal condition of the gall ducts or a cholecystitis.

Certain diseases of the liver may simulate gall-bladder disease, but they will usually present some distinguishing feature such as a large and tender liver in cirrhosis, a poor heart action in chronic passive congestion, and a positive Wassermann in syphilis. Diseases of the right kidney can usually be eliminated by urinalysis, ureteral catheterization, character of the pain and the use of the X-ray. A differential diagnosis between a chronic appendicitis and gall-bladder disease is sometimes difficult. This is especially so with a chronic post-cecal appendix where the pain is reflected towards the right hypochondrium. It is also difficult when the two conditions are associated. Ochsner says that 35% of all cases of cholecystitis are associated with disease of the appendix. A careful physical examination, a good history, and full laboratory report will be very necessary in making diagnosis.

Diseases of the stomach can usually be eliminated by gastric analysis and the X-ray. McKeand recently reported a case where a chronic cholecystitis with stones presented a typical picture of duodenal ulcer. Both pneumonia and angina pectoris should by history and physical examination be eliminated before making a diagnosis.

The gastric crises of tabes are suggested by disturbed reflexes and definitely recognized by an increased white cell count and positive Wassermann of the spinal fluid.

Herpes zoster and intercostal neuralgia will show tender points along the intercostal nerves.

Lead colic can be determined by the lead line, anemia with basophilic degeneration of the red blood cells, tremor, palsy, impaired sight and a history of contact with lead.

The diagnosis of some cases of gall-bladder disease is easy, but those of easy diagnosis are usually the ones of much severity or long standing. I think it can be safely said that the diagnosis of gall-bladder disease in its early stages is difficult in every case.

A complete history, a careful physical examination, a full laboratory report, a thorough X-ray study, and a careful consideration of those diseases likely to confuse, are essential to a diagnosis in early gall-bladder disease, but even then it is not always sufficient to tell the condition of the gall tract.

Early cases of gall-bladder disease are the ones with gastric symptoms and few or no symptoms pointing to the gall-bladder itself. It is in these cases that Lyons' method of duodenal drainage, proper diet, adequate exercise, symptomatic treatment and vaccine therapy are advantageous. When the disease has caused a formation of stones, a thickened gall-bladder wall, adhesions in the gall-bladder region, or a moderately severe or virulent infection, surgery is the only treatment, but here again it is important to make an early diagnosis in order that the better condition of the patient will minimize the operative risk and the operation itself will prevent many of the secondary changes, which gradually develop during the progress of the disease in the gall-bladder region, liver and pancreas.

I shall in conclusion report four cases. In order to be brief I shall mention only the important positive findings.

CASE I. Mr. M., age 28, white, male, railway fireman, was admitted to hospital March 23, 1921. On admission he had the right lobar pneumonia of four days' standing. Pneumonia ran an ordinary course with a definite crisis five days after admission, the temperature and pulse dropping to normal. Two days after the crisis, he developed pain in the right epigastrium, with temperature of 99.6°, and pulse 82 and slight nausea. This subsided in two days, and few days later he was discharged from hospital, returning to his work. During the following year he had three attacks similar to the one following the pneumonia, each one worse than the preceding, and complained most of the time from stomach trouble. A little more than a year, April 11, 1922, after his previous discharge, he was again admitted to the hospital with a temperature of 103°, pulse rate 100, severe pain over right epigas-

trium, palpable tumor over the gall-bladder, moderate jaundice and a leucocyte count of 14,000. The gall-bladder was removed. It contained about 1000 c.c. of dark viscid fluid, which was made up of bile, degenerated blood cells, pus cells, and epithelium with a streptococcal infection. The wall of the gall-bladder was thickened, and the mucous lining was reddened. The patient made an uneventful recovery and was discharged on May 6th, following.

I report this case because it is unusual for a staff in a hospital to have under observation the primary development of a case of cholecystitis and for the same staff in same hospital to later ascertain the pathology of the case in operation.

CASE II. H. S., age 44, colored, servant, married, female, weight 150 pounds, was admitted to hospital March 12, 1922. Had two miscarriages and four children. Healthy all life until six years before. Past six years has suffered most of the time with stomach trouble. Had periodic colics during this time with severe pain over the stomach. At first these attacks of pain would leave a soreness over the gall-bladder region. For the last two or three years the soreness was sometimes left over the gall-bladder region and sometimes over the appendix. Lately she said she had had more nausea with the beginning of the attack, and sometimes she felt she had a fever after the pain subsided. In two of the attacks she had had some jaundice. Upon admission she had just had an attack. The temperature was 99.6° and leucocyte count 10,300. She had tenderness over gall-bladder and appendix. Duodenal drainage was negative for microorganisms, although bile was dark. Operation disclosed a sub-acute appendix and a thickened gall-bladder wall, containing thick bile, and an enlargement of regional glands along the cystic and common ducts. Patient now doing servant's work.

I report this case because it is a case of associated appendicitis and gall-bladder infection with definite symptoms indicating each disease.

CASE III. Mr. J., white, male, age 37, married, family history negative, admitted to the hospital 20th of this month. Had measles, chickenpox, scarlet fever, pneumonia and influenza. Bad teeth. Present symptoms began one year ago after an attack of influenza, and

developed sufficiently acute to cause trouble four months ago. Had periodic attacks of dull aching pain over gall-bladder and pylorus, radiating to right shoulder. Pain has no relation to the taking of food. Had what he called bilious spells every week or so. Marked tenderness over gall-bladder region, especially after these attacks. Examination of stomach contents normal. Duodenal drainage showed B bile dark in color, but otherwise negative. The X-ray showed a distinct outline of the gall-bladder and a flattening of the duodenal cap. Diagnosis was cholecystitis. Operation revealed a large gall-bladder, filled with dark viscid bile, in which were pus cells, epithelium and streptococci. The wall of gall-bladder was thickened and attached to the duodenum by a band of adhesion as wide as the fundus of the gall-bladder and as deep as diameter of the duodenum. The special feature of this case was the definite picture of the gall-bladder and the distinct flattening of the duodenal cap, as shown by the X-ray.

CASE IV. Mrs. A., female, married, age 45, housekeeper, weight 160 pounds, was admitted to the hospital February 16th last. She had had one miscarriage and was mother of nine children. All labors normal except one about five years before, which was difficult. She did not know cause of trouble at this labor, but was in bed about six weeks following it. History of malaria and measles. Had bad teeth. Had history of periodic attacks of pain over the gall bladder region since the trouble with her delivery. This pain would last about twenty-four hours at a time, and was mitigated by rest in bed. Had stomach trouble in between the attacks of pain. On several occasions she had some jaundice. Stomach contents showed diminished gastric secretions. Apparent fullness over gall-bladder region, but no palpable mass. Tenderness over this region on pressure. Diagnosis of cholecystitis with gall-stones was made. Operation revealed a soft tumor about four inches in diameter, lying just anterior to the fundus of the gall-bladder and attached to the peritoneal covering of the quadrate and right lobes of the liver above and the upturned end of the omentum below. The tumor was removed and the omentum was allowed to go back to its place. The gall tract was found negative. Microscopical examination showed tumor to be a lipoma. The results were good. I report this case because it pres-

ented, in our judgment, before operation a gall-bladder picture and operation showed a lipoma.

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DISCUSSION.

DR. JULIAN RAWLS, Norfolk: I would just like to state that at the Peter Bent Brigham Hospital, in Boston, last week, I heard their pathologist state that they had obtained typical A, B and C bile from cholecystectomized patients.

VASCULAR OCCLUSION OF THE MES-ENTERIC VESSELS.*

By J. W. TANKERSLEY, M. D., F. A. C. S., Greensboro, N. C.

I bring this obscure and infrequent condition to your attention with the hope that those occasional deaths we have always had may be made still more infrequent. The problem of the surgeon in this day of perfected technique is to lower our death rate, and I believe it is in these obscure cases we now have to look for results.

My first experience with this condition was in 1914 and since then I have seen two others. All were lost and I believe with an early recognition of this condition, one, and possibly two of them, might have been saved. All three of my cases occurred following operations, but this does not mean the cases are confined to those following operations, many of them occur independently. The question of early recognition is important whether occurring post-operatively or independently. Since the first case reported by Tiedman in 1843, and Beckman in 1858, slightly over 400 cases have been collected by various authors. There is no doubt that many cases go unobserved, they are not so infrequent. Watson, at the Boston City Hospital, had his attention drawn to this subject and in the next year found eight cases. In 1,600 autopsies at the Johns Hopkins Hospital, four cases of thrombosis were found which had given no symptoms.

I have used the term "vascular occlusion" advisedly, because I am making no effort to distinguish between arterial embolism and thrombosis, neither am I going to try to differentiate between arterial and venous occlusion. While this may interest the pathologist, I believe clinically the course to be practically the same, certainly the ultimate results are the same in most cases unless we recognize the condition and give adequate treatment. It is true several cases of occlusion have been diagnosed and they recovered without operation, but these cases were the exception and likely of a slowly developing thrombosis in which collateral circulation developed, and I do not doubt that recognition of the condition with adequate treatment aided materially in the recovery. Trotter mentions in his report that in only about four per cent. of the cases was a diagnosis made.

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The pathogenesis of the condition is not well understood and several theories have been advanced with much experimenting, but from the very nature of the pathology one may readily see how hard it would be to simulate the actual conditions experimentally. It is true that occlusion practically always occurs in some part of the superior mesenteric, but I cannot see that its origin being higher up on the aorta or the angle of its origin being less acute can influence this condition. Most likely the distribution to the most active part of the intestines plays a more important role. It no more explains the cause than it does in thrombosis of the femoral in appendicitis, typhoid, etc. While an embolus will give a sudden closure should it lodge in a small vessel, it is logical to assume that it will be one of the small vessels near the distribution and that collateral circulation to a certain extent at least will delay actual necrosis and cause the symptoms to supervene so gradually that it is impractical to differentiate from a thrombosis, provided it causes any symptoms whatever. Then, too, a thrombus may not close the lumen completely and will not give positive symptoms until complete interference with the circulation is effected, or it may cause a spasm of the intestines with functional obstruction. It has been shown experimentally that you may have sufficient blood passing through a part to maintain life to that area but that it will not functionate. This may account for the symptoms simulating obstruction without finding obstruction at operation. Also, occasionally in experiments thrombosis has produced no pathology in the intestines, as shown by the post-mortem room. However, it will cause a sudden spasmodic contraction of the intestines, interference with function, and, if the ischaemia is continued, death of the part. This contraction may prevent the collateral circulation from adjusting itself as we know by experiments when blood is cut off from an area the vessels dilate and the blood flows faster in the surrounding area, nature's effort at repair. This prevention of the collateral circulation may give rise to the violent spasms, practically the same as in embolus. From these reasonings, you may readily see the futility of trying to differentiate between embolus and thrombus, venous and arterial, clinically. This might explain too why theoretically the collateral circulation should prove

sufficient but practically does not. How often a thrombus or embolus may cause trouble we are unable to say. Frequently too the area of infarction may be multiple, as appeared in one of our cases. Undoubtedly, we must have had a collateral circulation established after the thrombus formed but multiple emboli broke away from this thrombus causing separate infarcts.

Welch and Mall have shown by constricting mesenteric and anastomosing vessels to the point where $1/5$ of the normal is reached infarction takes place. This brings us again to the pressure exerted by the spasmodic contraction of the intestines, which would decrease the blood in that area, also the aid to lowered blood pressure obtained in decompensation from valvular lesions, myocarditis, arteriosclerosis. In one of our cases there was marked arteriosclerosis. I know I have ligated mesenteric vessels in accident cases far beyond what I considered the ordinary conception of safety to the intestines, only to have them make an uneventful recovery. If this interference is not too close to the gut, recovery is more apt to occur. Neiderstein's experiments show as much as 3 to 5 c.m. of gut, may be, separated from its mesenteric attachment and collateral circulation will be ample, but beyond 5 c.m. gangrene will supervene. (In 3 c.m. superficial necrosis occurs and with 5 c.m. necrosis and hemorrhage into the other coats.)

In the symptoms of this condition there is nothing pathognomonic. We find from cases observed that it occurs most frequently in men and about the middle decade of life. Cardiac disease, arteriosclerosis and recent operations are predisposing factors. Of course acute injury is always a factor to be considered. Pain is very severe and colicky-like, usually generalized in the abdomen, though it may become local later. If peritonitis sets in, it may again become general or local. In my cases nausea and vomiting did not set in till late. When vomiting does occur, it is first bile and the contents of the stomach, and later may become fecal. Obstipation is the rule and, when bowels are moved by means of an enema, frequently small amounts of blood may be found in the stools. This is not indicative but suggestive, always bearing in mind that blood may be found associated with obstruction, intussusception, tumors, etc. Tenderness of the

abdomen and muscle rigidity are always present and frequently may be localized over the involved area or mid-abdomen. Distention gradually develops and occasionally a small mass may be felt in the abdomen. The temperature is no guide, it usually falls at first and then gradually rises as peritonitis develops. This is true also of the leukocyte count, as the peritonitis commences, the white count rises. Shock is considerable in these cases and, from my experience, seems to be greatest with the initial onset of the pathology.

These are general symptoms only and represent the average case and diagnosis will have to be arrived at mainly by exclusion. As in other abdominal conditions you may find these symptoms aggravated or indefinite, especially may this be true where collateral circulation has been effected.

The first case in 1914, male 34 years old, of rather heavy build, was operated on for acute appendicitis. Did not have any trouble for about five days and then suddenly complained of severe pain in the mid-abdomen. Bowels were easily opened and we did not anticipate further trouble; however, that night he became worse and fever began to rise, abdomen slightly distended. On opening incision, lower ileum was found to be gangrenous from thrombosis in mesentery. Condition precluded extensive operation and he was drained freely with the hope of doing something radical should he improve. Condition gradually grew worse and he died that afternoon.

The second case was somewhat similar but more rapid in onset and more quickly terminated. A colored man 47 years old was operated on for suppurative appendicitis, peritonitis general, freely drained. Six days afterwards while temperature had been normal and apparently well on the road to recovery he developed acute pain in the right iliac region, abdomen rapidly began to swell, and he went into profound shock. Temperature in this case fell and pulse became very rapid and weak, breathing fast and shallow and he soon passed out. Did not go in for further examination of his intestines but from the original wound intestines were seen to be almost black at upper part of the wound. Their color had previously been good and from the general symptoms and onset we were sure an embolus had developed. We were assisted in this diag-

nosis by the fact that while he gave his age as 47 it appeared nearer 67 and there was extensive arteriosclerosis. Possibly this extended from the abdominal aorta.

The third case was a young lady of 21, operated on July 28, 1921, by Dr. Henry Boyles, for subacute appendicitis, clean case. Had been suffering with her appendix for one year. She was apparently making a good recovery from her appendectomy till August 6th, nine days after her operation, when she started vomiting and became somewhat restless. No rise in temperature and pulse only slightly quickened. Next morning had a small bowel movement from enema, developed hic-cough, temperature now began to rise and she complained of severe pain in abdomen, general but somewhat to lower abdomen, abdomen distended somewhat and much muscle rigidity. Bowels moved again that afternoon and had a fairly good night. No report of blood in the stools. Next morning vomiting fecal in character and it was at this time I saw the case. Advised immediate operation and found one large infarct from thrombus in mesenteric vessel, several smaller infarcts in walls of intestines (ileum) on distal side, entire area covered about 20 c.m. This was resected and end-to-end anastomosis done. Patient was very much shocked when we operated and died about twelve hours later. This was the case I believe started from a thrombosis and emboli developed causing the multiple infarcts.

TREATMENT

The question of palliative or imperative treatment requires the most careful consideration. The mortality rate seems to be almost as high in one as in the other but I believe with early diagnosis of the condition we will offer our best chance to the patient by surgical interference. I believe where the symptoms come on gradually there is a chance of possible recovery by complete rest to the intestines, supportive measures, saline, glucose and opiates, and hot applications to the abdomen. On the continent, where they seem to have given this subject more attention than here, the Germans advocate diuretin. Just how this does good I do not know and have had no experience with it. Jaschke, of Berlin, says it is important to give digitalis before operation, especially if there is doubt of the heart action. In his experience, getting patients up

early has reduced thrombosis one-half and emboli one-third.

Should an infarct occur, I believe there is only one treatment, excision of that area. This operation was first performed by Elliott in 1895 and reported in the *Annals of Surgery*. Since then many have been successfully operated. Should the onset and symptoms be mild, I would advocate watchful waiting but should the symptoms be very acute or rapid in onset, I think your best hope would be quick interference. Even then the extent of the involvement would indicate the possible chances of recovery. Exploratory laparotomy under local anesthesia will certainly do little harm and might be the deciding factor in what appears otherwise a hopeless case. Having decided upon operation, the sooner it is undertaken, the better the patient's chances.

SUMMARY

1. That the pathology is most often a thrombosis in some part of the superior mesenteric vessels and that the mucosa of the intestines suffers first and most. This gives the blood in the stools.

2. Occasionally an embolus or thrombus may cause no apparent symptoms; or, if symptoms do occur, they may clear up, due to the establishment of collateral circulation. This is accounted for possibly by the slowness in closure of the vessel. The permanency of the collateral circulation is to be doubted as cases have been reported where it broke down subsequently and caused infarction with death.

3. Intestinal obstruction may occur without infarction, as the blood supply to the parts may be sufficient for nourishment but not for function.

4. Should infarction occur, as shown by degree and progress of the symptoms, operation, with excision of the infarcted segment, offers the only solution.

MESENTERIC THROMBOSIS WITH REPORT OF TWO CASES.*

By STUART McGUIRE, M. D., Richmond, Va.

Individual surgeons do not often see cases of mesenteric thrombosis, hence the occurrence of two cases in my practice has led me to write this paper. Virchow in 1847 first described occlusion of the mesenteric vessels as a pathologic entity; Litten in 1875 published

a paper describing the clinical manifestations of the disease; Jackson, Porter and Quimby in 1904 analyzed the histories of 214 reported cases, of which forty-seven had been operated on with four recoveries or a mortality of ninety-two per cent.; Trotter in 1913 collected and tabulated 366 cases, of which only thirteen or four per cent. had been correctly diagnosed before operation or autopsy.

The number of recorded cases of mesenteric thrombosis has largely increased and the death rate greatly diminished since Trotter's investigation of the subject in 1913, but the disease still presents problems in diagnosis and treatment sufficiently important to make it well worthy of thought and study. The superior mesenteric artery supplies all the small intestines and the upper portion of the large bowel. It is what is termed an end or terminal vessel and, if it becomes occluded, collateral circulation is very rarely established. The same factors which lead to embolism and thrombosis in general may occasion embolism and thrombosis of this artery. In some cases no adequate cause can be discovered, while in other cases the condition may be attributed to injury, to an infection, or to diseases such as arteriosclerosis or endocarditis. The usual effect of obstruction to a superior mesenteric vessel is a hemorrhagic infarct of the small intestine corresponding to the distribution of the branches involved. The intestinal wall becomes thickened, edematous, and of a dark red color. There is usually a sharp line of demarcation between the healthy and diseased bowel, although this is not always the case. The lumen of the bowel is distended with dark, tarry blood, and the peritoneal cavity usually contains a considerable amount of bloody fluid. In some cases the gangrene is limited to a few inches of intestines. In other instances many feet are involved.

In rapidly forming thrombus involving a considerable part of the intestinal tract the invasion is sudden and the course rapid. On the other hand, if the thrombosis is of slow formation and the segment of intestine is small, the invasion may be more gradual and the course may be prolonged. In acute cases, the symptoms are ushered in with absolute abruptness at a time when the patient is apparently in good health. The pain is at first colicky in character, but later becomes continuous. It is often so agonizing that it pro-

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duces collapse or shock as evidenced by subnormal temperature, rapid irregular pulse, cold clammy skin and blueness of the extremities. Usually there is nausea and vomiting. There may be either diarrhoea or constipation. If the former, the movements are watery and frequently blood stained. If the latter, obstruction is complete, neither flatus or feces being passed. At first the abdomen is soft and flaccid and palpation gives no pain or discomfort. If the patient lives sufficiently long, however, the abdomen becomes distended, rigid and tender, and the temperature rises to 104° or 105°F.

The diagnosis of mesenteric thrombosis is extremely difficult. There is no symptom-complex of the disease, and it is rarely recognized before operation or post mortem. Fortunately, the condition is so acute and urgent that an exploratory operation is plainly indicated. When the peritoneum is opened, there is usually the escape of a considerable quantity of dark colored or bloody fluid which makes it evident that the disease is not appendicitis, cholecystitis or a gastro-jejunal perforation. The distended black coils of gangrenous bowel are most commonly found in the pelvis or lower abdomen.

The operation of choice is, of course, the resection of the diseased bowel, followed by the restoration of the continuity of the intestinal canal by an anastomosis of the divided ends. If the general condition of the patient renders this impracticable, then the gangrenous portion of the bowel should be excised and the two cut ends drawn out of the abdomen and fastened to the edges of the wound, with the hope that a secondary anastomosis may be done later. In doing the resection, great care should be taken to divide the intestines well outside the infected area in tissue with good blood supply. It is remarkable what a large proportion of the length of the patient's intestines may be removed without death or subsequent impairment of health. Flint collected from literature fifty-eight cases in which for various causes more than four feet of small bowel had been removed. Of these cases forty-nine survived operation. The greatest length resected was in a case of strangulated hernia reported by Brenner in which over twelve feet were removed. This patient died two and half years later of inanition. Zenas concludes from the results of ex-

periments on animals that it is possible for a man to live even though as much as one-third of his intestinal tract has been sacrificed. In the two cases reported in this paper seven feet four inches of small bowel were removed in the first case and four feet six inches in the second, and up to this time no digestive or metabolic disturbance has been noted in either patient.

CASE I. Mrs. T. W. E., age 27, patient of Dr. Edward McGuire and Dr. B. H. Gray of Richmond, was admitted to St. Luke's Hospital, February 15, 1918. The patient had been operated on about two years before for chronic appendicitis and retroversion of the uterus. She was now four months pregnant and had suffered considerably with nausea and vomiting.

The following was the history of her present illness. After a comfortable night's sleep, she took a bath, ate her breakfast, went to the toilet and had a satisfactory stool. At 9:30 a. m. she was suddenly seized with agonizing pain in the abdomen for which repeated doses of morphia were given with comparatively little relief.

She had nausea and vomiting and showed evidence of shock. Her temperature by rectum was normal, but her pulse ranged between 140 and 150. Her abdomen was not tender, rigid or distended, on the contrary its walls were soft and relaxed and the enlarged uterus could readily be palpated.

The uterus was apparently considerably larger than the period of pregnancy would account for, and Dr. Gray stated it was almost double the size it had been when he examined the patient a week or ten days previously. The leucocyte count was 20,000 and hemaglobin was sixty per cent.

Forty-eight hours after the onset of the attack she was brought to the hospital. She continued to suffer intense pain and to have a very bad pulse, but she had developed no fever or local evidence of peritoneal infection.

No definite diagnosis could be made, although intrauterine bleeding or rupture of the uterus were considered the most likely possibilities. It was realized that some catastrophe had occurred in her abdomen, and as she was rapidly growing worse, it was decided to do an exploratory operation. Under gas oxygen anesthesia her abdomen was opened by a midline incision. As soon as the peri-

toneum was opened, there was the escape of a quantity of bloody fluid. When the abdominal contents were exposed, a mass of gangrenous small bowel was found surrounding the fundus of the uterus. There were no adhesions, but the black coils of intestines made a Medusa-like cap which invested the uterus so closely and symmetrically as to give it the apparent increase in size noted before the operation. The gangrenous bowel was delivered through the wound and a rapid excision done with end-to-end anastomosis. The pelvis was drained with rubber tissue and the wound closed. The specimen of bowel removed measured seven feet four inches. The patient was given no treatment to combat shock while on the table, but every effort was made to complete the operation with the least possible delay. She was returned to bed apparently none the worse for the ordeal, and her general symptoms shortly began to improve. She made an uneventful recovery, and eventually was delivered of a living child. The patient is now in good health and apparently suffers no symptoms from the curtailment of the length of her intestinal tract.

CASE II. Miss S. W. age 46. patient of Dr. M. O. Burke and Dr. Garnett Nelson of Richmond, was admitted to St. Luke's Hospital, March 27, 1922.

The patient had been operated on some years before and a supra-vaginal hysterectomy done. She had for some time apparently been in perfect health. On the morning of the day of her present illness she went to her place of business and was suddenly seized with violent abdominal pain while at work at her desk. She was carried back to her apartment and physicians summoned. She was given two hypodermics of morphia with atropia, and later a soap suds enema was administered which resulted in a large stool accompanied by the discharge of considerable gas.

When I saw her in consultation several hours later she was still suffering severe paroxysmal pain in the abdomen, although her pupils showed the effect of the large doses of morphia she had been given. She had constant nausea and occasional vomiting. Her temperature was 96° F., pulse 120, and she showed evidences of marked shock.

Her abdomen was not distended, there was no tenderness or rigidity on palpation, and no

mass or tumor could be made out. There was no visible peristalsis and no movement of gas could be heard with the stethoscope. The leucocyte count was 18,000 and hemoglobin was seventy per cent. The patient's agony was the most extreme I have ever witnessed and she begged for relief or death.

The possibility of volvulus, acute pancreatitis, or a gangrenous Meckel's diverticulum was considered, but no diagnosis more definite than an "acute abdomen" was made.

As the indications for an immediate operation were plain, she was transported to the hospital. Under ether anesthesia her abdomen was opened six hours after the onset of her illness. As soon as the peritoneal cavity was incised there was the escape of a quantity of bloody serum and coils of gangrenous small intestines presented themselves in the wound. After being delivered through the incision, the bowel was found to be distended and filled with dark fluid. The mesentery was thick, edematous and no pulsation could be felt in the mesenteric vessels. The line of demarcation between the healthy and diseased bowel was sharp and well defined.

The mesentery was ligated and divided, the bowel resected and an end-to-end anastomosis with suture done. The abdomen was closed without drainage. The specimen removed measured four feet, six inches.

The patient made a rapid and uneventful recovery. She states that before the operation she suffered from chronic constipation. Now she has a natural action each day and does not have to take laxatives.

DISCUSSION.

DR. J. SHELTON HORSLEY, Richmond: The condition described by Dr. Stuart McGuire is a very interesting one. In general practice great attention should be accorded it. There is much difficulty in making a correct diagnosis. The onset of sudden pain without distention, and usually without much abdominal rigidity, and the passage of blood, are always significant.

A very important point in operating for this condition is to take out a sufficient amount of bowel. It is much better to risk too much bowel than too little in cases of this kind. If the bowel looks healthy, but does not bleed readily on incision, the resection should be carried back to a point where it bleeds readily. I lost a case once because of this error.

DR. J. BOLLING JONES, Petersburg: I remember a case on which I operated, upon which a diagnosis of ruptured appendix had been made. All of the symptoms were in the right side and pointed to ap-

pendicitis. The onset of the illness was very sudden and, when I saw the man after the onset of the illness, I gave a diagnosis of ruptured appendix.

To operate I gave a saline transfusion. Upon taking out the appendix, the blood just spurted out. I never saw so much blood in my life. After looking into the mesentery I found nothing wrong. I closed the incision, and went back to the original operation.

The man's condition improved visibly while on the table, and he made an uneventful recovery.

DR. C. C. COLEMAN, Richmond: I have been very much interested in the causes of pain associated with certain vascular lesions. Terrific abdominal pain characterized the clinical history of both Dr. McGuire's cases, and this appears to be the outstanding symptom of mesenteric thrombosis. It is interesting to speculate upon the cause of this pain when the mesenteric vessels are occluded by blood clot. If the mesenteric artery is ligated, it is hardly probable that the pain would be extremely severe, or that shock would be a pronounced symptom. Certainly ligation of the femoral artery, even under local anesthesia, causes very little pain, whereas occlusion of the popliteal or femoral by an embolus causes intense pain. The mechanism of pain conduction in these cases is not clear.

It has been thought by some that the sympathetic fibres which accompany the vessels are pain conductors, or that some of the peripheral nerve fibres have been split off high up, and become fused with the sympathetic, and that these fibres are unmyelinated and convey painful stimuli in certain vascular conditions. When a vessel is ligated, the sympathetic fibres in the vessel wall are intercepted along with the blood stream, whereas, in thrombosis it may be that these fibres are stimulated, thus causing the pain which clinically characterizes the latter condition.

As a practical application of this theory, it is sometimes advisable to excise the sympathetic fibres from the large blood vessel walls in certain painful amputation stumps. It is well known that in some of these cases, unless an adherent neuroma is present, re-amputation does no good, whereas stripping the vessel of its sympathetic fibres is considered by Le Riche and others a procedure of the greatest value for relief of pain.

This discussion naturally has no bearing upon the important feature of Dr. McGuire's paper, which is that an abdominal emergency, generally fatal, was recognized and relieved by prompt operation.

DR. STUART MCGUIRE, Richmond, (closing): As I brought out in my paper, I did not make a correct diagnosis before operation in either of the two cases reported. If I see a third case, however, I am reasonably sure I will recognize its true nature.

In mesenteric thrombosis everything depends on an early diagnosis and prompt operation. I believe the disease is much more frequent than is generally supposed, and many cases die without a correct diagnosis being made. At present 92% of these patients die, but the mortality should not be greater than in other acute abdominal conditions.

I trust that every time we have a patient with agonizing abdominal pain, attended by symptoms of shock, we will bear in mind the possibility of mesenteric thrombosis in determining whether or not an immediate operation is indicated.

THE DIAGNOSIS OF INTESTINAL PARASITIC INFECTION.*

By T. DEWEY DAVIS, M. D., Richmond, Va.

Assistant in Nervous and Mental Diseases, Medical College of Virginia.

The importance of intestinal parasitic infection in the rural districts of the South has been frequently emphasized, and the general practitioner, as a rule, is on the alert for these cases, but many of them get through his hands either because he is not prepared to make the stool examination or the examination can not be sufficiently thorough. Some obscure cases are referred to specialists for diagnosis, and in this examination the presence of parasites is more frequently recognized. This statement is supported by the fact that in 248 stool studies made by the author, twenty-seven, or eleven and two-tenths per cent, were positive for parasites of various kinds. Practically all of these cases were referred for some neurological condition.

The complaints of these patients were many and varied, but about eighty-five per cent. of them had symptoms relative to the gastrointestinal tract. Most frequently there was constipation and gas with vague discomfort in the abdomen consisting of fleeting and indefinitely localized pains. The cases of pin worm infection all had pruritus ani, and two of them had a persistent vaginal discharge. This symptom in female children should always be investigated by careful stool study or examination of scrapings from the anal region. In about half of the cases there was an increased appetite, or the desire for certain foods was noted. There was a very slight anemia in a few of these cases, but in most of the patients the hemoglobin was well within the normal limits. The stunted stature and backward mentality usually considered in connection with intestinal parasites were not marked features in these cases, probably because the number of parasites present was relatively few. The majority complained of general weakness and fatigability.

One fact that should be considered is the home environment of the patient. Practically all of the positive cases came from small towns or rural districts where sanitary disposition of human excreta is not generally practiced. It is of importance to inquire if

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the patient has ever had "ground itch" or "dew sores," for these are always suggestive of hookworm infection. It is also well to ask if any worms or segments have been passed.

The routine differential blood count is of especial value in determining the advisability of stool examination, for in the author's series about eighty per cent. showed an eosinophile count of three or more per one hundred white cells. This increase was particularly marked in two cases of *strongyloides intestinalis* infection. In one it was fifteen, and in the other twenty-one per cent.

The special neurological complaints were depression, vague nervous symptoms, hysteria, epileptiform convulsions and choreiform movements. One case is of such interest that it is worthy of mention in detail. This was a boy five years of age who came into the Sanatorium with a severe multiple neuritis which later developed into a suggestive subacute poliomyelitis. A stool examination was not made until a week after admission. At this time it was found to contain numerous round worms and a few hookworm ova. By the concentration method given below it was estimated that there were fifteen thousand ova per cubic centimeter of stool. One enormous round worm was expelled after a treatment with oil of chenopodium. The child could not remain in the hospital longer, but after discharge began to improve rapidly and in three months was absolutely well. It seems entirely possible that the nervous symptoms were toxic in origin, the source of this toxin being the parasite, since shortly after its expulsion the child began to improve. With a true poliomyelitis and the amount of paralysis present, it hardly appears possible that recovery should have been so rapid with no resultant weakness or atrophy. Norbury,¹ in a recent article, states that hookworm disease may at times be confused with poliomyelitis.

Osler² and other authors state that intestinal parasites may give rise to various and sundry nervous symptoms such as epilepsy, hysteria, chorea and mental disturbances. The question of how these are produced is still a debated one. Various investigators have found that toxic substances can be derived from the *ascaris lumbricoides* which will produce an intoxicating effect on the nervous system shown by hallucinations, delirium and other disturbances, and also blood destruction. This may

possibly be due to an anaphylactic reaction, but the symptoms were more on the order of a toxemia. With these toxic substances in the worm it is hardly necessary to turn to mechanical and impaired nutritional effects as an explanation of all the symptoms produced. The injury produced by the hookworm in attaching itself to the intestinal mucosa is of some consequence, especially when there are several hundred of the worms present, and the local infection about these points which must certainly take place from the swarms of bacteria constantly present may play a part in producing the symptoms. This is undoubtedly a causative factor of some of the abdominal pains. The intense anal pruritus produced by the pin worm may easily irritate an unstable individual and throw him off his normal nervous balance.

The method of examination used by the author is a combination of the centrifuge and salting out procedures. In addition one or two slides are studied made from an emulsion of the feces in water. These plain slides are of value chiefly in the search for larvae of the *strongyloides intestinalis* since their ova are rarely found in the stools. Several different procedures were tried out on the same positive stools, and the method outlined below gave the highest concentration of ova.

A piece of stool of approximately a cubic centimeter in size is emulsified with about thirty mls of water and this is poured into centrifuge tubes. These are run at a moderate rate of speed just long enough to throw the larger particles of feces to the bottom. The proper length of time may only be determined by experience with the centrifuge machine in use. The water is then decanted off and discarded. The tubes are filled with a saturated solution of sodium chloride and centrifuged a somewhat longer time than the above. The surface liquid is carefully removed by means of a capillary pipette. It is worthy of note here that one should place the tip of the pipette close around the side of the tube since the outer portion of the meniscus is the highest and the ova necessarily collect in this circle. The contents of the pipette are then discharged into a clean centrifuge tube, the tube is shaken after filling with water, and centrifuged for about the same length of time as in the first instance. The water is then decanted, the sediment is thoroughly shaken

up and transferred to a slide. Examination is made with the low power objective using the higher magnification for identification in the doubtful cases. If the procedure has been properly carried out the ova will stand out clearly with little fecal matter to cloud the field of vision. This method is of special value in examining stools containing any of the petroleum oils where the oil droplets are very annoying. These droplets are entirely separated by this procedure. The whole process takes very few minutes and saves considerable time over the straight slide method, especially should the stool be negative.

The author has never seen the fact mentioned in the literature, but the diagnosis of pin worm infection may be made in the routine urine examination of females. The worms invade the vagina and deposit their ova about the vulva from which they are washed by passage of the urine. Recently two such cases were seen where the ova were present and easily identified.

SUMMARY: The general practitioner, particularly in rural districts, should be constantly on the alert for intestinal parasitic infection.

The history, environment, eosinophilia, and clinical symptoms of the patient are of help in suspecting the presence of parasites.

Parasitic infection may account in part, or in whole, for the symptoms of certain neurological conditions.

Many of the symptoms are undoubtedly a result of toxins excreted by the parasites.

The method of stool examination outlined above was found to be the most reliable to detect the presence of the ova.

Urine examination is of value in making the diagnosis of some of the cases of pin worm infection of females.

608 *Professional Building.*

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DISCUSSION.

DR. W. A. PLECKER, Richmond: This question of intestinal parasites has in recent years been almost forgotten as a subject of much importance, particularly that of hookworm. Ten or twelve years ago the people of the Southern States were pretty well informed as to the importance of this by means of the Rockefeller fund of one million dollars, which was used for education along this line in these states.

Since the intense educational work that was done at that time in many sections of the South, we probably do not see so many cases of hookworm as we saw formerly,—children that were undersize, bloated and anaemic, and those who could not make any progress in their studies when at school. Those cases have been pretty well cured, I think, but there are still a great many cases of mild hookworm infection which should receive attention, and it seems to me to be the duty of the family physician in the rural sections of the State, where he is responsible for the well being of all members of the family under his care, to see that examinations are made and children cured. I have seen acute symptoms entirely cleared up upon the removal of three or four hookworms. Just that small number will produce a condition which will be very marked. It is surprising what they will do.

I personally made examination of children in the schools of four counties, 10 to 12 years ago; one county showed 65% infection and one school 100%. These children were treated and instructions given as to sanitary conditions, and several years afterward another member of the Board of Health examined the school children in this county and found 11% infected where I found 65%.

That, of course, is the best evidence I ever had of the real effect of the work that was done at that time. But it has not all been done, and I would like to impress upon you who practice in the rural sections of Virginia, the importance of keeping this question in mind and watching out for these infections. I do not know of anything that will give better results, in the easiest manner possible, than the cure of cases of hookworm infection.

STRICTURE OF THE URETER.*

By AUSTIN I. DODSON, M. D., Richmond, Va.

Urologist to St. Elizabeth's Hospital, and Instructor in Genito-Urinary Surgery, Medical College of Virginia.

Strictures of the ureter resulting from tuberculosis of the kidney and the occlusion of the ureter in malignant processes are overshadowed by the pathology causing them, while congenital strictures usually result in a fatal issue before their presence is known. Acquired strictures of traumatic and pyogenic origin are now known to be a definite clinical entity and, if not relieved, may be the cause of irreparable damage to the kidneys.

The pathology of ureteral stricture is inconstant, varying with the degree of stricture, the length of time it has existed, and whether or not there is infection. In the earliest stage there are no demonstrable changes except obstruction to the passage of a catheter. Dilation of the ureter and pelvis is not present if the patient is seen early. In two of our patients pyelograms were entirely negative. Later there is dilation of the ureter and pelvis. In one case an ounce of urine could be

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withdrawn. Four months after dilating the stricture the pelvis contained only ten c.c. of urine.

Stasis encourages infection and stone formation so that it is not infrequent in long standing cases to find a rather marked pyelitis and occasionally a stone. Quite recently we have observed a case in which a small stone had lodged in a stricture completely occluding the lumen of the ureter and destroying the function of the kidney.

Every surgeon can recall patients who have had abdominal operations for chronic appendicitis, malposition of the pelvic organs or exploratory operations where no definite pathology was found, and who later returned stating that their symptoms were just as bad as before operation. There are others for whom, because of the vagueness of the symptoms and the absence of physical signs, operation was refused. Many of the former group of patients are often operated upon a second time for adhesions, which are usually found, as after most abdominal operations, but the adhesions are innocent of causing any discomfort to the patient. Others may be passed up as neurasthenics and rest and "change of scenery" prescribed.

If such patients are more closely questioned, many of them will give a history of night voiding and day frequency of urination which should put the examiner on the right track. In ureteral stricture this symptom occurs either periodically or constantly in a large percentage of cases. The symptoms of ureteral stricture are largely due to increased tension in the pelvis of the kidney and, like the symptoms of most renal lesions, are often indefinite and confusing. They are insidious in onset and usually worse during a menstrual period or after exertion. All of the cases in our group have complained of pain in the lumbar region and lower part of the abdomen. There is usually tenderness over the abdomen and in advanced cases costovertebral tenderness. I have found pus in the urine in about fifty per cent. of cases, dependent on whether or not there is an accompanying infection. The urinalysis is not significant. The diagnosis is dependent on a thorough cystoscopic and X-ray examination of the urological tract, which should be carried out in all cases having abdominal pain or distress which does not point

definitely to some organ as the site of disease.

The cystoscopic appearance of the bladder is in no way helpful. It is frequently entirely normal and, when there is hyperemia and edema around the trigone and ureteral orifices, it is the result of an accompanying pyelitis. In the opinion of most writers the wax bulb or acorn-tipped bougie is necessary for the detection of strictures. In the cases coming under our observation this has not been necessary. The obstruction has been found by a number six catheter, and always in the lower three inches of the ureter. In some cases, after injecting mineral oil and inserting a stilet, the catheter will slip by the obstruction; in others, a small catheter has to be used. The smallest stricture met with in our group admitted with difficulty a number three bougie. When an obstruction is met with, stone, ureteral kinks and pressure on the ureter from tumors must be ruled out before a diagnosis of stricture can be made. The wax-tipped catheter and an X-ray picture will rule out stone. Ureteral kinks can usually be demonstrated by a pyelo-ureterogram made with the catheter withdrawn to within a few centimeters of the ureteral orifice. Tumors large enough to cause pressure on the ureter can be palpated. With these factors eliminated, any obstruction met with in the same location at two examinations may safely be considered a stricture.

The chief causes of ureteral stricture are pyogenic infection, traumatism, and tuberculosis of the kidney. In renal tuberculosis the kidney itself demands our attention, and the condition of the ureter is of no importance. Strictures from pyogenic infection may be the result of infections adjacent to and involving the ureteral wall, or may be due to a descending infection from the kidney pelvis or to a localized ureteritis caused by distant foci of infection. Attention was first called to focal infection as a cause of ureteral stricture by Hunner. Geisinger (*Annals of Surgery*, December, 1917), cited cases in which focal infection seemed to bear a definite relationship to ureteral inflammation. More recently Bumpus and Meisser of the Mayo Clinic have succeeded in producing lesions in the kidney, bladder and ureters of animals by injecting intravenously cultures of organisms recovered from teeth and tonsils of patients suffering

with infection of the urological tract (Bumpus and Meisser, *Jour. A. M. A.*, 1921, Vol. LXXVII, pp. 1475-1479). Traumatic strictures are caused by the passage of stones from the kidney, and by traumatism of the ureter during operative procedures, especially operations on the pelvic organs.

The treatment consists in dilating the stricture with bougies and catheters. I have found the Garceau catheter quite satisfactory. The manipulations should be very gentle and may be repeated in from five to ten days, according to the reaction produced. Often the gentlest possible manipulation will bring on an attack of intense pain accompanied by nausea and vomiting, requiring large doses of opiates for relief. Fortunately, these attacks are less severe following each succeeding dilation. Usually four or five treatments are sufficient to produce a symptomatic cure, but it is well to have the patient return for examination at intervals of two or three months for at least a year. If there is an accompanying pyelitis, it can be treated at the same time by pelvic lavage. We have found a solution of silver nitrate to be very satisfactory.

We have had eight cases of ureteral stricture under observation. Three had had previous abdominal operations without benefit. Two of these were operated upon for chronic appendicitis, and one for retroversion of the uterus. One patient had his right kidney operated upon and drained for pyonephrosis ten years before we saw him. In two cases symptoms came on shortly after a difficult delivery followed by pelvic infection while two others had had repeated attacks of tonsillitis.

Six of these patients have been free from discomfort since treatment. One refused treatment because of a severe attack of kidney colic brought on by examination, and one has recently returned with a recurrence after complete relief for twelve months.

DISCUSSION.

DR. J. F. GEISINGER, Richmond: I have for some years been interested in the condition admirably described by Dr. Dodson in his paper.

In some quarters, it is fashionable to deny that there is such a thing as a stricture of the ureter of the type under consideration. This is due largely to the tendency to accept and imitate the attitude of some of the great lights of genito-urinary surgery, who have long ago lost personal contact with the minor procedures of urology, from which come the data necessary for a recognition of this condition. As a result, many cases which appear to be entitled to more consideration, are passed unnoticed.

On the other hand, there is in a different quarter

a tendency to go to the opposite extreme, and one occasionally hears of immense series of cases reported in blocks of five hundred at a time. It is not difficult to imagine that enthusiasm has here been allowed to get somewhat out of bounds.

I prefer the medium ground. At the Stuart Circle Hospital, in Richmond, we were among the first to give serious attention to this condition and some years ago published our conclusions as explicitly as was possible at that time. Increasing experience has served only to confirm those conclusions. I am, therefore, in spite of any opinions to the contrary from whatever source, convinced that there is such a thing as stricture of the ureter of the so-called Hunner type, that it is of fairly common occurrence, that it is productive of definite and sometimes disabling symptoms, and that it is amenable to control and often to cure by appropriate measures. I admit that the diagnosis must be made with caution and requires some experience and judgment; and furthermore that the prognosis must be guarded. This, however, obtains of many conditions. In the main, therefore, it may be said that with the indispensable aid of the cystoscope, the diagnosis of ureteral stricture can be accomplished with reasonable accuracy and that its treatment, usually by the same instrumental means, offers relief to the patient that, when it occurs, is always gratifying and often striking. It is assumed, of course, that the data assembled is always sufficient to justify the diagnosis. The urinalysis may be entirely negative. The pyelogram, in the early stages of this low grade obstruction, may be practically normal. The pain, which generally constitutes the chief complaint, may express itself in unusual locations. In spite of these drawbacks, however, the experienced urologist will usually be able to detect the condition and not infrequently to proceed therefrom to its correction.

DR. ———: I want to ask Dr. Dodson if this condition occurs more frequently in the female. The literature on the subject gives one that impression.

DR. DODSON, in closing: In answer to Dr. ———'s question, I believe strictures of the ureter do occur more frequently in women. The fact that they are more frequently subjected to peric operations and are more prone to pelvic infections furnishes a reason for this. Strictures do occur in the male ureter and should be looked for.

UROLOGICAL DIAGNOSIS FROM THE STANDPOINT OF THE GENERAL PRACTITIONER.*

By LAWRENCE T. PRICE, M. D., Richmond, Va.

A good many patients have come to me for urological examination in whom it has seemed probable that a tentative or complete diagnosis could have been made by the family doctor, with proper use of the methods and information at his command. The object of this paper is to emphasize the value of some of these simple methods, and also to call attention to the fact that a careful history combined with local examination may bring out many facts which would ordinarily be overlooked.

That it is to the interest of the general prac-

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itioner to obtain as much information as possible toward the diagnosis of these cases will be readily admitted. If his diagnosis is positive, it may be possible for him to institute his own treatment and thus save his patient the time and expense of a journey to a specialist. If his diagnosis is tentative, he may direct his case more intelligently and the more information he can give his patient as to the nature of the trouble the greater is apt to be the respect accorded to his knowledge.

Many of the points brought out are not new and some of them have been included in the course at medical schools. The seeming unfamiliarity on the part of many members of the general profession with certain essential urological facts has been deemed sufficient justification for discussing the subject in some detail.

It should be remembered that a discharge from the meatus of the urethra is not always gonorrhea, that every case of frequent and painful urination is not due to cystitis, and that a hematuria may originate elsewhere than in the kidney. Subjective and objective symptoms apparently of serious import may be due to some simple condition which can be easily relieved.

On the first examination of a patient presenting urological symptoms, it is of primary importance to have a careful and detailed history, as it is only in this way that a clear conception of the case may be obtained. Information should be elicited as to the following details: (1) time and circumstances of first symptoms, (2) predisposing causes, (3) history of traumatism, (4) previous attacks of similar nature, (5) treatment already instituted. The patient's own idea as to the nature of his trouble should be noted, but the physician should draw conclusions only after painstaking interrogation followed by careful physical examination. For instance, a patient may present himself for treatment for a case of gonorrhea and his own observation of his malady may seem to corroborate the diagnosis; the presence of a balano-postitis or a chancre or chancroid of the meatus or urethra may be the cause of the purulent discharge. If the first condition be present, the pus, together with inability to retract the prepuce, and the history of omission of bathing for several days will establish the diagnosis without the aid of a microscope. If a chancre be

present, the diagnosis may be established by the time of incubation together with the presence of a localized area of induration. The period of incubation in chancroid is the same as in gonorrhea, but the character of the discharge is different, and palpation will reveal an infiltration which does not occur in chancre. It may be noted, however, that it has been my experience to observe the appearance of a chancre of the meatus during the treatment of a gonorrhea. This observation was fortunate for the patient, in that treatment for the specific condition was begun at an unusually early period of the disease.

A patient with an apparent gonorrhea may have instead, an aseptic urethritis or a non-specific urethritis. Here the history of exposure to infection, excessive use of alcohol or sexual over-indulgence is very helpful in establishing the diagnosis. It should be mentioned that the use of the microscope is more definitely conclusive in differentiating these latter conditions than the history alone, as it will demonstrate the presence of gonococci in the discharge, the presence of microorganisms other than gonococci, or the absence of bacteria.

The prostatic urethra, the verumontanum and the neck of the bladder contain highly developed sensory nerve terminals in their mucous membrane and are very vascular. These localities, therefore, are extremely sensitive and may present symptoms due to causes more or less remote. For example, a pyogenic infection in the kidney pelvis will produce a secondary bladder infection with symptoms at the bladder neck; there being no subjective evidence to indicate the location of the primary lesion. The bladder acts as a reservoir, giving an opportunity to the organisms to attack the tissues.

In the urological examination of male patients I use the Thompson three glass test, as a routine measure. For this simple test the conical urine sedimentation glass is desirable and may be obtained at any drug store. Ordinary drinking glasses or white glass bottles may be used, however. The patient voids the entire bladder contents into the three glasses, making the amounts as nearly equal as possible. Glass number one represents the first urine, glass number two the middle urine, and glass number three the last.

In an acute gonorrhea, the urethra is washed

clean by the first urine, therefore, the first glass will be cloudy and the second and third clear. In chronic anterior-posterior gonorrhea and prostatic infections, the first glass will be cloudy, the second clear, and the third cloudy. This is because the pus from the urethra appears in the first urine, while at the end of urination the perineal muscles contract, causing expulsion of the infected contents of the prostate and vesicles with resulting cloudiness of the third glass. In the presence of a vesical calculus causing bladder infection, the first and second glasses will be relatively clear and the third cloudy or bloody, owing to the fact that by sedimentation the blood or pus has accumulated in the lowest part of the bladder. In kidney infections the infectious products have become thoroughly mixed with the urine so that all three glasses will appear cloudy.

Three cases will be cited to illustrate the value of the above test.

CASE 1. Patient sent for examination on account of the presence of hematuria. The doctor who referred the case wrote a letter indicating his belief that a pathological condition of the kidney was present. The three glass test showed almost pure blood in the first glass, second and third clear. Urethroscopic examination revealed a very vascular papilloma in the pendulous urethra, which was removed by cauterization. The hematuria immediately came to an end.

CASE 2. Patient referred for a protracted and obstinate case of gonorrhea with continued meatal discharge. All three glasses very cloudy. Enormous amount of pus and many bacteria found under microscope. Cystoscopic examination with ureteral catheterization revealed marked unilateral pyelitis.

CASE 3. A patient came under my observation with the following history: Five years before he had had a swelling in one epididymis with apparent abscess formation. A diagnosis of tuberculosis of the epididymis and testicle was made by a surgeon whom he consulted, and a radical operation was done for removal of the offending organs. Three years later a similar condition developed on the opposite side and the remaining testicle and epididymis were removed by a second surgeon. At the time I saw him, all three glasses of the voided urine were cloudy, which caused the opinion that kidney pathology was present. Cysto-

scopic examination revealed a well developed tuberculous infection of one kidney and of the bladder. If this simple test had been done at the onset and the obvious deduction made, a complete urological examination would have revealed the primary condition and the double castration would possibly have been avoided. At least, he might probably have been saved the second operation.

Urine which is cloudy in appearance does not necessarily contain pus. Alkaline urine may be heavy in phosphates, especially after the ingestion of albuminous food, e. g., eggs or milk. A few drops of acetic acid will cause such urine to become perfectly clear. Phosphatic urine sometimes causes frequency of urination and burning, which may simulate a more serious condition. The internal administration of sodium acid phosphate will acidify the urine, it will become clear and the symptoms will come to an end.

As is well known, the old method of diagnosis of stone in the bladder was the attempt to elicit a grating sensation upon passage of a sound. This procedure seems to have been forgotten or neglected, as many cases referred for diagnosis turn out to be due to vesical calculus. A sound, passed with the bladder partly full of urine or water, should detect a stone unless it be encysted. This is not a difficult procedure in the hands of the general practitioner and the method possesses value. Of course, the size and number of stones can be determined only by cystoscopic or X-ray examination. Correct diagnosis of acute pain in the right side of the abdomen may be a most difficult problem, especially in the female. However, the ability to use a microscope and to make a blood count will enable one to form a fairly clear idea as to the possibility of a right renal or ureteral calculus being the cause of the symptoms. The absence of leucocytosis plus the characteristic urinary findings will be overwhelmingly in favor of the presence of a calculus, and the history and symptoms will, of course, be of value proportionate to the completeness of the clinical picture. A hypodermic of morphine administered at home may thus be the only immediate treatment necessary and the consideration of removal to a hospital for a possible emergency surgical operation will be eliminated. If the doctor himself is not equipped to do the microscopical work, he may in the present day often find

a nearby physician or technician who can help him out.

Digital rectal examination will often establish a diagnosis of hypertrophied, adenomatous or malignant prostate. Acute prostatitis or vesiculitis may likewise be discovered by this method. The hypertrophied or adenomatous prostate is invariably symmetrical and its contour is smooth: it is not hard to the finger and not tender, but is distinctly dense. Acute prostatitis presents somewhat similar palpatory findings but is softer and extremely tender on pressure. A malignant prostate may be normal in size or enlarged, and can be felt to be very hard and irregularly nodular. It is not usually symmetrical owing to unequal distribution of the involvement. There is no pain on pressure, as a rule. In vesiculitis, a soft nodular, fluctuating mass, very painful on pressure, may be made out adjacent to either of the upper corners of the prostate. The latter may be normal or acutely inflamed. Massaged secretions from acute prostatitis or vesiculitis examined microscopically or culturally will show the character of the infection present and thus treatment will be indicated. Prostatitis and vesiculitis occur in the young and middle aged adult; hypertrophy and malignancy are seen in patients past middle age.

It is obvious that the points brought out in this paper have in no way been intended to cover the whole subject of urological diagnosis. Many cases will require cystoscopic or X-ray examination, or both, with special urinary and bacterial studies, to work them out satisfactorily. I would reiterate that my idea has been to be of assistance to the general practitioner by taking up some points believed to be of real value to him. It is hoped that this object has been to some extent fulfilled.

Professional Building.

ROENTGEN RAY AS AN ADJUVANT IN TREATMENT IN ADVANCED CASES OF CARCINOMA OF THE STOMACH.*

By CHARLES R. ROBINS, M. D., Richmond, Va.

Professor of Gynecology, Medical College of Virginia; Surgeon,
Stuart Circle Hospital.

This paper is based on observations and experiences with one case. It is, therefore, sub-

ject to the criticisms of such a paper. On the other hand this case has been selected because I had the opportunity to thoroughly study it and verify my conclusions so that the deductions are based on fact and, in addition, the case is one of a type, and experiences of a similar nature in other conditions, lead me to believe that this case is in a way representative.

Carcinoma of the stomach presents many problems, the greatest of which in my experience is that these cases come too late for radical treatment by operation. Cancer of the stomach is seen not infrequently, but it is certainly uncommon to find cases that are seen early enough to warrant an operation for radical cure. What we usually see is an emaciated patient, vomiting, and with a fixed palpable mass in the abdomen and with no prospect at all for operative cure. Efforts have been made to temporarily alleviate this condition by the operation of gastroenterostomy, done in the hope that the food will pass through the artificial opening and in this way give them temporary relief by relieving the vomiting. My experiences with this operation have been rather discouraging and I have found that, although the operation was successful in securing the mechanical result of an artificial opening, often the nausea would continue and certainly the benefit to the patient would apparently last but a very short while. The nausea in these cases is not altogether due to the obstruction but is to a great extent due to the bloody exudate thrown out in the stomach from the cancerous growth, and the vomiting of this is likely to continue independent of the relief of the obstruction. The real relief to the patient has been so frequently negative or of such short duration that I had been rather discouraged and inclined to forego operation entirely unless the case presented hope for radical cure. I have, however, had rather gratifying experiences with the treatment of malignant growths by Roentgen Ray, resulting in a prolonged relief of symptoms although the cases were not finally cured. This has been practically true where Roentgen Ray treatment was accompanied by indicated operative treatment, and often I believe we can secure the best results by this combined treatment. The case which I wish to report today is as follows:

CASE NO. 25-377. Mr. L. B. W., 59, white, male, married. He came to me for treatment on May 30, 1920. He stated that his trouble

*Read by title at the fifty-third annual meeting of the Medical Society of Virginia in Norfolk, October 31-November 3, 1922.

had commenced about 15 months before. The symptoms were those associated with ulcer of the duodenum, hunger pain, food relief, and indigestion. He had been treated by various doctors and at first had been relieved of his symptoms and had gotten so that he could eat nearly anything he wanted. In the preceding fall, however, he commenced to complain again and was told that he had pylorospasm but was finally diagnosed as carcinoma of the stomach and operation suggested. At the time that I saw him he was suffering from pain in the abdomen, which had its maximum intensity in the epigastrium. The pain was not constant, was of a cutting character and was produced by anything he ate. At that time he was eating rice and other soft food and up to that time had had no vomiting. On examination of the abdomen a mass was not felt, patient was pale and anaemic looking, hemaglobin 45%, occult blood in stools. The x-ray showed a constant defect in the stomach. It was thought that the case was possibly one in which a radical operation could be done and the patient was operated on June 1st, 1920. Exploration showed a hard indurated tumor involving the stomach just proximal to the pylorus, and about the size of a small fist. The abdominal wall was thick and mass had not been felt at examination. It was freely movable but seemed to involve the lumen of the stomach sufficiently to almost completely occlude it. Some metastasis was found in the omentum draining from the carcinoma and one of the nodules was taken for microscopic examination. The pylorus was loosened and on lifting it up there was found a chain of glands extending upward as far as could be reached. As under these circumstances a radical operation could not promise any cure, a posterior gastro-enterostomy was done for temporary relief. The patient stood the operation very well although he was in a very much depleted condition. After the operation there was considerable distress and vomiting. It was determined in this case to supplement the operation by x-ray treatment of the growth and, as soon as the patient could be moved, the treatment by x-ray was commenced and was administered by Dr. Fred M. Hodges. It was thought that the case was one in which a good effect was problematical, but from the first treatment with the x-ray his condition began to improve and in a short time he got so that he could eat

any sort of food he desired except pickle and his general condition improved remarkably. This improvement continued over a period of fifteen months, at the end of which time he died of the carcinoma in the liver.

The experience in this case was so remarkable and so different from that of similar cases in which the x-ray was not used, that I am convinced that we have in this combination treatment of operation for relief of obstruction together with treatment of the growth by the Roentgen Ray, a method which holds out great possibilities. It is possible that some of these cases may be cured entirely, but if not, the prolonged relief secured is certainly well worth the inconvenience and distress of the operation.

The use of the Roentgen Ray in this and similar cases is undoubtedly accomplishing a great deal. It has the advantage of being easily applied and with the technique used at the present time there is comparatively little danger of burns to the skin. It is possible to concentrate the ray on the growth without injury to the intervening tissues. In this way the efficiency of Roentgen Ray treatment is materially increased and a large field for its application is opened up.

Stuart Circle Hospital.

PROGRESS OF MALARIA CONTROL IN VIRGINIA.*

By L. L. WILLIAMS, Jr., M. D.,
P. A. Surgeon, U. S. Public Health Service,
and

CLINTON A. KANE, M. D.,
Director, Malaria Control, Virginia State Board of Health.

Malaria is a mosquito borne disease, the control of which most effectively depends upon preventing the easy access of mosquito to man during those times when the malaria mosquito, the *Anopheles*, feeds. Another good method of control is the attack upon the parasite through quinine campaigns. A combination of these two methods may be used to advantage.

Obviously, the most effective control is through the suppression of the *Anopheles* mosquito which is the only vector of malaria. This was first done in our hemisphere in 1901 in Havana where drainage of ponds and cleaning and oiling of streams was instituted in connection with the combined yellow fever and malaria campaign which removed or rendered

*Read at the fifty-third annual meeting of the Medical Society of Virginia in Norfolk, October 31—November 3, 1922.

unfit for use the propagation areas of these water breeding insects.

Three years later the same type of work was commenced in the sanitation of the Canal Zone and carried through to the well-known result. It was not until 1915 that Virginia commenced control of malaria. Since then control work has advanced with its ups and downs, with its experiments and testing of new methods, until the present year in which we see work well started and on a firm foundation.

Since the start, practically all methods of malaria control have at one time or another been tested in this State with varying degrees of success. Table one shows the various methods adopted in the 1922 program as outlined by Dr. H. R. Carter, the measures of control being used as particularly suited to each community. When the first work was commenced seven years ago in a small town¹ in

DIAGRAM SHOWING METHODS AND MEANS OF PREVENTING MALARIA.

- I. *Getting Rid of Anopheles.*
 1. Destruction of shelters.
 - a. Cutting down brush and weeds.
 2. Destruction of breeding places.
 - a. Draining and filling.
 - b. Oiling or fouling.
 - c. Introducing fish.
- II. *Preventing access of mosquitoes to well men.*
 1. Screening the house.
 2. Mosquito bars.
- III. *Preventing the infection of mosquitoes.*
 1. Treating infected men until completely cured of malarial infection.
 2. Keeping such men under mosquito bars and in screened houses.
- IV. *Immunizing people against malarial fever.*
 1. Quinine.

tidewater Virginia, some drainage of mosquito breeding areas was undertaken which was good though incomplete. The greatest dependence was placed upon screening. This town undertook to see that all homes were properly screened. This is an excellent method provided it is done by the greater number of homes and provided the screens are kept in good repair. This takes advantage of a well known characteristic of the *Anopheles* mosquito. This mosquito flies and bites only at night. Of all the *Anopheles* (in Virginia we have three species) the *Anopheles quadrimaculatus* probably carries most of our malaria. This species prefers to bite in-doors, in a room without light. These conditions are found almost exclusively in bedrooms at

night; hence adequately² screened houses are an almost complete protection against malaria.

The history of this town is interesting in that they commenced with a small amount of drainage and much house screening; allowed screening to become less and less effective through lack of repair, but, have increased the drainage operations until this year when it has been decided to complete the drainage of all mosquito breeding areas in or about the town.

The year following the commencement of work, four new towns undertook anti-malaria campaigns. The parallel history of two of these places pointed a lesson. One town controlled malaria very effectively through the complete screening of all homes, the reduction of human carriers by a quinine campaign, and a small amount of drainage work. The work has not been kept up and this place has been renewing its malaria ever since. The other town controlled malaria through drainage of mosquito breeding ponds and cleaning and oiling of all streams. This work has been regularly maintained every year through annual appropriation including the appointment of a municipal officer to take charge of the work. For a municipality anti-mosquito drainage is the method most productive of permanent results. The year 1917 started out well with three new places, commencing some drainage but extension of the work was disrupted at the commencement of this country's participation in the world war. Practically all work ceased except those places where camps or other war work went on on a large scale. Twelve such places were drained for the control of mosquitoes and the work of maintenance continued through the next year at all places. With the cessation of the war only one town of the twelve war-projects maintained the excellent work completed.

The next year surveys were commenced of numerous tidewater communities and supervision of the maintenance of three towns which were all of the twenty projects to continue work during the reaction which followed the war. 1920 saw a slight increase of two new projects and three continuing, 1921 with one new project and four continuing.

Prior to the season of 1922 the State Health Department organized a Bureau of Malaria

²Adequate screening means the screening of all doors, windows, chimneys, and other openings, with screen not larger than 16 meshes to the inch.

¹Wakefield.

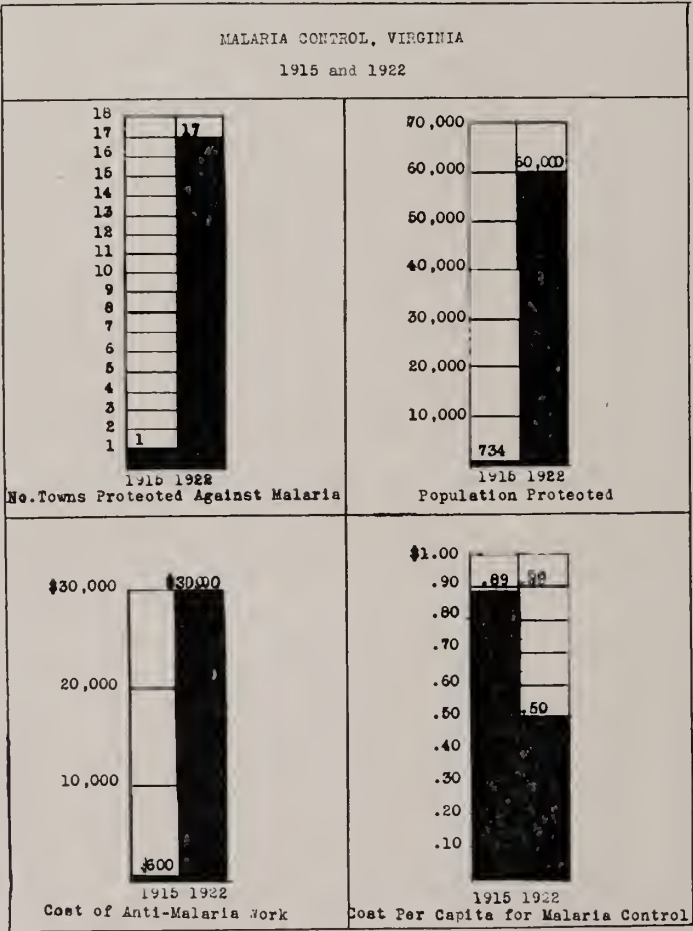
Control and, in co-operation with the International Health Board and the Public Health Service, placed three men in the field for the sole purpose of malaria control. As a result of this, plus the excellent education accomplished by the former workers, the work was maintained at those four places which had previously continued control and thirteen new towns commenced malaria-control through anti-mosquito drainage.

That this type of work is effective is unquestionable. A quotation from Dr. Bagby of West Point will illustrate the result, "Of 158 patients seen in 1909, ninety-six had well defined cases of malaria with chills, fever, sweats, etc. * * * * During the five summer months of 1922 I did not have in town a single typical

probably maintain the same for all time. Five have done partial drainage and are in a position to complete and maintain the work during subsequent seasons.

It will be noted that work heretofore has looked towards malaria control in towns. It is necessary to extend this work to the rural sections and place malaria control on a county-wide basis. It is readily seen that this cannot be economically done through drainage alone. We believe that drainage immediately adjacent to farm houses, that the extension of agricultural drainage will play a part, but that the main dependence for many years to come will be secured through the adequate screening of the country homes.

Experience has shown that screening cam-



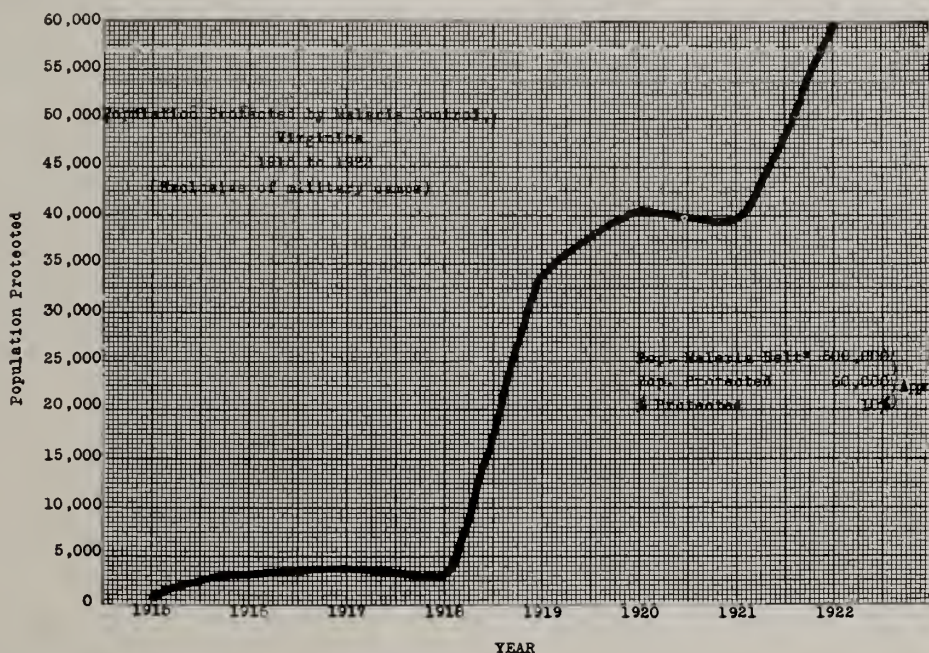
case of malaria. * * * * My competitor * * * * says he has not had a case of malaria this summer." Anti-malaria work was done in this town in 1920 and it is one of the towns which has maintained the work ever since.

Of the thirteen new projects, eight have completed necessary drainage work and will

paigms are productive of a good immediate result, but maintenance is not secured. There is one exception, Greensville County, where in the most malarious section a screening campaign was not only successful but has been maintained to date. In this county a sanitary officer, supported largely by the county,

has been on active duty for three years. He carried on the campaign and has secured adequate maintenance ever since.

If the counties in the malaria sections of Virginia had active health organizations, then rural malaria control would be added to their activities. Two such counties support Health Departments which have undertaken to add rural malaria control to their other activities. As there are no other such, then the first step in rural malaria control is the building of an active organization in these counties. We are glad to report that a good start has been made, in that one county has just organized a health department, the main consideration being the control of malaria on a county-wide basis.



In conclusion, I present this chart showing the population protected against malaria in Virginia from one town in 1915 of 734 people to seventeen towns in 1922 of 60,000 people.

The work has steadily progressed in almost exact ratio to the advancement of popular education. To further aid this propaganda, a course of school instruction in malaria control has been in force during the past season in 300 schools and will be extended into 300 more this coming year.

VIRGINIA TOWNS MAINTAINING MALARIA CONTROL, 1915-1922.

YEAR	NEW PROJECT.	OLD PROJECT MAINTAINED
1915	Wakefield	None
1916	Toshes	Wakefield
	Ironto	
	Wilson	

1917	Emporia Kress Gilmerton Abiline (War camps)	Wakefield Emporia
1918	None	Wakefield Emporia (War camps)
1919	None	Wakefield Emporia Newport News
1920	West Point Virginia Beach	Wakefield Emporia Newport News
1921	Richmond	Wakefield West Point Emporia Newport News
1922	Smithfield Suffolk Lawrenceville Oceana	Wakefield West Point Emporia Newport News

Ocean View
Holland
Ivor
Windsor
South Boston
Kenbridge
Kempsville
Nansemond
Kecoughtan

REPORT OF A CASE OF ACUTE EX-OPHTHALMIC GOITRE TREATED SUCCESSFULLY BY USE OF X-RAY.*

By M. D'ARCY MAGEE, M. D., Washington, D. C.

The successful use of X-ray as in the case of hyperthyroidism, especially of the acute ad-

*Read before Society of Northern Virginia, District of Columbia and Maryland, November 22, 1922.

weeks. fracture healed but frequent attacks of tachycardia, von Graefe's sign, and usual clinical evidence of toxic thyroid became more pronounced. She was put to bed, digitalized, and under careful supervision failed to show any subsidence of symptoms. Dr. Lindsay, at Garfield Hospital, made a metabolic reading April 31, 1922, and patient's weight at that time was 105 lbs., temperature 98, pulse 100, respiration 24, and basal metabolic rate, plus 42 per cent. She showed marked tremor, bulging of eyes, with insomnia. She was then referred to Dr. C. Augustus Simpson for X-ray therapy and operation deferred on account of marked thyro-toxicosis. Seven X-ray treatments were given at intervals of three weeks. Interspersed with these were observations and metabolic tests to determine the effect of the rays on toxicity and the progressive decline of the metabolic rate.

Clinical symptoms present were tachycardia, tremor, sweating, headaches with loss of weight, and digestive disturbances. There was a noticeable decline in the nervousness and pulse rate following first few treatments which is shown on the chart herewith. The gland itself was of the soft parenchymatous variety, both lobes uniformly enlarged with no redness or evidences of cystic or colloidal degeneration. At present it is scarcely visible.

This fact is borne out by the pathology of the proven effect of X-ray on the thyroid gland. If any doubt exists in the minds of the internist or surgeon, I should like to refer them to an article appearing in the December, 1919 number of the X-ray journal, by Waters, of Johns Hopkins University, who in collaboration with Dr. Goetch gives a series of five dogs whose right glands were exposed to the action of X-ray and then removed and compared to the left untreated glands which he used as controls.

The alveola epithelium of the treated gland was atrophied and thinned out to a mere line resembling an inactive gland such as is frequently seen in symptomless colloid goitre; in other words, from the pathology there was in evidence a very marked reduction if not very nearly complete absence of secretory function in the cells of the thyroid gland as a direct result of the X-ray exposure.

Recent reports of Massachussetts General Hospital disprove the old idea that X-ray

therapy renders a subsequent operative interference more difficult.

The marked decline of the pulse with the metabolic curve and increase of the weight in this case will be observed. At present the patient's metabolism is 6 plus and her pulse 72, and return of weight lost before treatment.

I do not wish to detract from the brilliant results obtained in surgery, but realize that in such cases as the one I report where rest and treatment do not ameliorate symptoms, we should consider X-ray therapy, since it entails less risk, does not inconvenience the patient, or hospitalize the sufferer.

This case only confirms the results of other successful achievements attributed to the X-ray, and I feel it should encourage its use in just such cases where operative procedure is hazardous.

1623 Connecticut Avenue.

REPORT ON A CASE OF SECONDARY CARCINOMA OF THE LUNG WITH PULMONARY TUBERCULOSIS.

By J. TERRELL SCOTT, A. M., M. D., Colorado Springs, Col.
Associate Physician, Cragmor Sanatorium.

NAME: J. F. R.—American farmer, age 50 years, entered August 10, 1922.

COMPLAINT: Weakness, loss of weight, cough, expectoration and hemoptysis.

FAMILY HISTORY: Negative; no tuberculosis or malignancy.

PAST HISTORY: Has had the usual diseases of childhood but no serious illnesses or operations. He denies venereal disease and has always been in good health until several months ago. A year ago, in the fall of a truck from a bridge, he was thrown against the seat and injured his back.

PRESENT ILLNESS: Began last spring with cough, expectoration and loss of appetite. He consulted his physician in May, was told that he had some trouble in his lungs, although sputum was negative, and was advised to come to Colorado. His cough and expectoration is slight, appetite good and at entrance he feels fine. His sputum has been blood streaked with clots at times since June. Highest temperature has been 101. Normal weight is 150 pounds, but he has declined from 163 to 123 pounds.

PHYSICAL EXAMINATION: On inspection, the patient appears fairly well nourished,

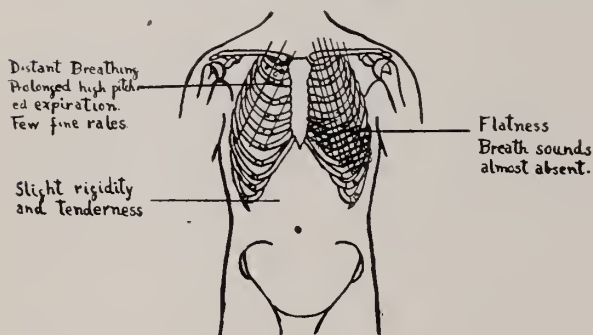
slightly anemic, and accustomed to hard manual labor.

On *percussion* on the right, there is dullness over the front, and to the 5th dorsal spine behind; on the left, dullness over both front and back.

Auscultation reveals markedly prolonged high pitched expiration on the right to the 3rd rib and 4th dorsal spine with distant breathing, a few rhonchi over the front, no rales. On the left, breath sounds almost absent over the base behind; no rales.

A few weeks later a second examination showed a few fine and medium coarse rales in the 2nd interspace on the right and in the base behind on the left.

Heart normal. Trachea drawn to the right. Thyroid isthmus palpable. Marked myoidema



of the biceps—more on the left. Pupils equal and react normally. Other reflexes normal. Abdomen negative except for slight tenderness and rigidity in the right upper quadrant.

CLINICAL LABORATORY FINDINGS: Temperature range: 98.5 to 100. Pulse 80 to 100.



tuberculosis. The X-ray showed a dense triangular shadow on the left extending from 6th rib to diaphragm with the apex outward, and numerous small calcified nodules and extensive mottling throughout the right lung and upper left.

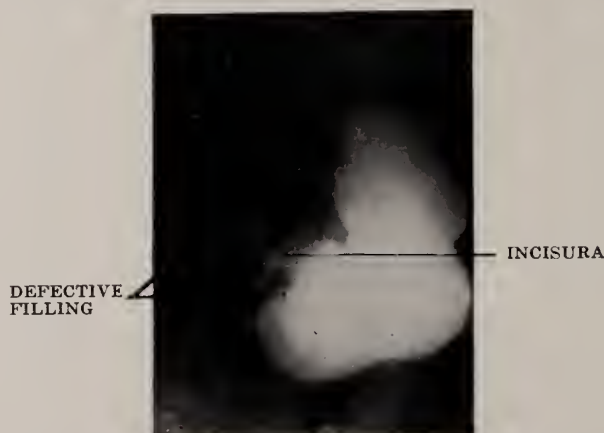
August 21st, the patient first complained of pain in stomach.

September 6th, he had severe vomiting and cramps but had gained 6 pounds.

September 11th, blood Wassermann negative. Hemoglobin 85% (Talvquist). Total whites 21,600, lymphocytes 24%, polymorphonuclears 73%, eosinophiles 1%. Gastric analysis showed the presence of large amounts of blood and bile. Total acidity 20 degrees, free hydrochloric acid 8 degrees. The patient complained of pain upon passage of the Einhorn tube, and stated that he had passed some dark blood by bowel the previous day and had felt dizzy at times. No diagnosis yet made; malignancy strongly suggested. Patient put on a modified Sippy diet.

September 21st, patient expectorated a semi-solid gelatinous mass, stating that it was the second occurrence. Upon section and microscopic examination by Dr. Ellis of Colorado Springs, it was pronounced a bronchial cast containing mucus, blood clots and carcinomatous cells.

September 25th, the patient was given a

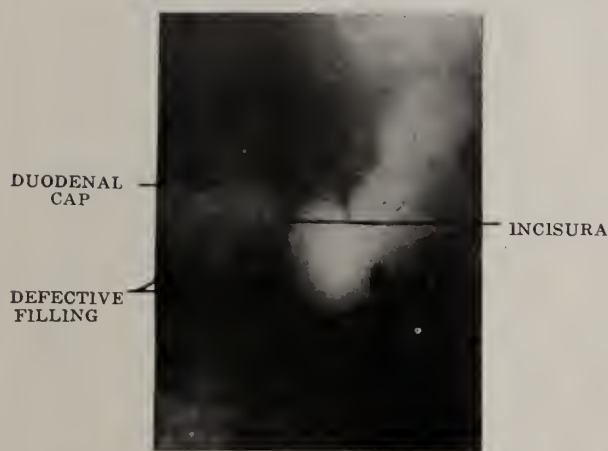


barium meal, X-ray and fluoroscoped by Dr. W. F. Drea. The plates showed imperfect filling of the duodenal cap and pyloric end of the stomach.

DIAGNOSIS: Carcinoma of the stomach metastasizing in the lung; pulmonary tuberculosis.

Blood pressure: systolic 107, diastolic 77. Urine negative. Sputum negative for tubercle bacilli repeatedly. A guinea pig was injected with sputum but autopsy showed no

AUTOPSY: The patient was sent home and intensive X-ray treatment suggested, which was tried without benefit. He died November 13th. At his request, an autopsy was performed by Dr. J. L. Travis of Germantown, Ohio. The entire lower half of the left lung was carcinomatous and firmly adherent to the diaphragm. A carcinomatous mass the size of a golf ball was found in the pylorus, ad-



herent to the head of the pancreas and to two inches of the transverse colon. The pylorus was patent. A tuberculous non-caseating mass about three inches in diameter was found in the upper half of the left lung.

DISCUSSION: This case had many of the classical symptoms of pulmonary tuberculosis and of course this was first considered. The X-ray shadows in the right and upper left chests are characteristic and the absence of tubercle bacilli does not rule out tuberculosis. Secondary anemia, leucocytosis and subacidity are all compatible with such a diagnosis. Were it not for the unique shadow in the left base and the late gastro-intestinal symptoms, we would be justified in making such a diagnosis alone. Gastric ulcer will produce hemorrhage and blood in the stools but is usually accompanied by hyperacidity and the absence of high leucocytosis. In favor of malignancy of the digestive tract we have: (1) the age and sex of the patient, (2) moderate subacidity, (3) blood in gastric contents and feces, (4) marked loss in weight, (5) moderate anemia, (6) symptoms referred to stomach, (7) suspicious X-ray shadow.

This case is interesting:

1. Because of the *delayed appearance of symptoms* referable to the gastro-intestinal

tract, probably partly due to the patent pylorus.

2. Because of *metastasis* to the lung causing pulmonary symptoms before any other.

3. Because of the expectoration of bronchial *casts of carcinomatous cells*.

STUDIES IN HAY FEVER.

Dates of Pollination of Anemophilous Plants in the District of Columbia and Vicinity, Observed in 1922.*

By HARRY S. BERTON, A. B., M. D., Washington, D. C.

Associate-Professor of Hygiene and Preventive Medicine, The School of Medicine, Georgetown University.

In order to determine the degree of importance of various plants in the causation of hay-fever in the District of Columbia, it has been deemed essential to secure pollen from as many species as possible. It is a well established fact that entomophilous plants, such as the rose, daisy, goldenrod, goldenglow, sunflower and dandelion, play no part in hay-fever, despite the popular belief. These plants are insect-pollinated. The amount of pollen floating in the air is exceedingly scant. Hay-fever symptoms, however, may be produced by them in sensitive individuals upon direct inhalation. Attention has, therefore, been given only to the anemophilous plants, i. e., those which depend upon the wind for distribution of their pollen.

The seasonal occurrence of hay-fever symptoms is obviously dependent upon the flowering period of the offending plant. It is consequently a matter of great interest to know what plants have come into bloom, coincident with the onset of the disease. In the fall type of hay-fever, this information does not assume the importance it does in the spring and summer types. There is a succession of dates between April and the middle of August which mark the advent of the initial symptoms. Knowledge of flowering dates inevitably assists in the selection of appropriate pollens for cutaneous testing. As a rule, this important data is not available for a given community, and standard text books of Botany are restricted of necessity to general rather than to specific information in regard to flowering dates.

It is our purpose, therefore, to record herein the dates of pollination of various wind-pollinated plants.

*From the Clinic of Applied Immunology, Woman's Welfare Association.

nated plants, 66 in number, which have been observed in the course of field work during the current year. This list does not include all the anemophilous plants in the District of Columbia. Completion of this work will demand additional effort.

The value of the following tables is only relative because of the many factors which influence the flowering of plants. Thus, trees, lining the city streets, are likely to pollinate earlier than similar trees in the suburban districts, because of the heat retained in the asphalt pavements. Even a difference of seven days in pollination has been noted in a cluster of black walnut trees on one lot.

TABLE I.

ALPHABETICAL LIST OF ANEMOPHILOUS PLANTS WITH DATES OF POLLINATION.

Common Name	Botanical Name	Date
Alder	<i>Alnus rugosa</i>	Feb. 22.
Ash, White	<i>Fraxinus americana</i>	April 9.
Beechnut	<i>Fagus grandifolia</i>	May 2.
Birch, Black	<i>Betula nigra</i>	April 15.
Boxelder	<i>Rulac negundo</i>	April 8.
Bur Marigold	<i>Bidens frondosa</i>	Aug. 15.*
Chestnut	<i>Castanea dentata</i>	June 15.
Dock, Curly	<i>Rumex crispus</i>	May 18.
Grasses:		
Barnyard	<i>Echinochloa crusgalli</i>	Aug. 1.*
Bermuda	<i>Capriola dactylon</i>	July 7.*
Bottle Brush	<i>Hystrix patula</i>	June 20.*
Brome	<i>Bromus Purgans</i>	June 20.*
Corn	<i>Zea mays</i>	July 15.
Couch grass	<i>Agropyron repens</i>	July 8.*
Crabgrass	<i>Digitaria sanguinalis</i>	July 15.*
Dropseed	<i>Sporobolus neglectus</i>	Aug. 5.*
Eulalia	<i>Miscanthus sinensis</i>	Oct. 14.*
Fox-tail Yellow	<i>Chaetocloa lutescens</i>	July 17.
June	<i>Poa pratensis</i>	May 16.
Meadow Fescue	<i>Festuca elatior</i>	July 9.*
	<i>Melica mutica</i>	June 5.*
Orchard	<i>Dactylis glomerata</i>	May 25.
	<i>Panicum anceps</i>	Aug. 6.*
	<i>Panicum annulum</i>	Aug. 6.*
	<i>Panicum boscii</i>	Aug. 6.*
	<i>Panicum virgatum cubense</i>	July 13.*
	<i>Panicum yadkinense</i>	Aug. 6.*
Paspalum	<i>Paspalum pubescens</i>	Aug. 6.*
Perennial Rye	<i>Lolium perenne</i>	May 25.
Purple Top	<i>Triodia flava</i>	Oct. 5.*
Red Top	<i>Agrostis palustris</i>	June 14.
Rye	<i>Secale cereale</i>	June 5.*
	<i>Sphenopholis obtusata</i>	May 30.*
Sweet Vernal	<i>Anthoxanthum odoratum</i>	May 9.
Terrell	<i>Elymus virginicus</i>	June 25.*
Timothy	<i>Phleum pratense</i>	June 11.
	<i>Uniola latifolia</i>	July 15.*
Wild Rice	<i>Zizania palustris</i>	Aug. 10.
Gum, Black	<i>Nyssa sylvatica</i>	May 13.
Gum, Sweet	<i>Liquidambar styraciflua</i>	April 26.*
Hazelnut	<i>Corylus americana</i>	Feb. 22.
Hemp	<i>Cannabis sativa</i>	Aug. 1.
Hickory	<i>Hicoria sp.</i>	May 3.
Ironwood	<i>Ostrya virginiana</i>	April 15.
Locust, Honey	<i>Gleditsia triacanthos</i>	May 8.

Maple, Norway	<i>Acer platanoides</i>	April 9.
Mock Orange	<i>Toxylon pomiferum</i>	May 18.
Mulberry, White	<i>Morus alba</i>	May 1.
Oak, White	<i>Quercus alba</i>	May 3.
Oak, Scarlet	<i>Quercus coccinea</i>	April 15.
Oak, Spanish	<i>Quercus rubra</i>	April 27.*
Paper Mulberry	<i>Papyrius papyrifera</i>	May 1.
Pigweed	<i>Chenopodium album</i>	Aug. 15.
Pine	<i>Pinus virginiana</i>	April 26.
Plantain, Common	<i>Plantago major</i>	June 15.*
Plantain, Rib grass	<i>Plantago lanceolata</i>	May 9.
Poplar, White	<i>Populus alba</i>	Mar. 20.
Ragweed, Short	<i>Ambrosia elatior</i>	Aug. 17.
Ragweed, Giant	<i>Ambrosia trifida</i>	Aug. 10.
Sheep Sorrel	<i>Rumex acetosella</i>	May 9.
Sycamore	<i>Platanus occidentalis</i>	May 1.*
Tree of Heaven	<i>Ailanthus altissima</i>	May 18.*
Walnut, Black	<i>Juglans nigra</i>	May 3.
Willow, Crack	<i>Salix fragilis</i>	April 15.
Wormseed	<i>Chenopodium ambrosioides</i>	Sept. 4.
Wormwood	<i>Artemesia vulgaris</i>	Sept. 10.

*Pollen not collected.

TABLE II.

DATES OF POLLINATION IN CHRONOLOGICAL ORDER.

1922	June
February	5. <i>Melica mutica</i>
22. Alder	Rye Grass
Hazelnut	11. Timothy Grass
March	14. Red Top
20. White Poplar	15. Chestnut
April	Common Plantain
8. Boxelder	20. Bottle Brush
9. Norway Maple	Brome Grass
White Ash	25. Terrell Grass
15. Black Birch	July
Crack Willow	7. Bermuda Grass
Ironwood	8. Couch Grass
Scarlet Oak	9. Meadow Fescue
26. Pine	13. <i>Panicum virgatum cubense</i>
Sweet Gum Tree	15. Corn
27. Spanish Oak	Crabgrass
May	<i>Uniola latifolia</i>
1. Paper Mulberry	17. Yellow Fox-tail Grass
Sycamore	August
White Mulberry	1. Barnyard Grass
2. Beechnut	Hemp
3. Black Walnut	5. Dropseed Grass
Hickory	6. <i>Panicum anceps</i>
White Oak	<i>Panicum annulum</i>
8. Honey Locust	<i>Panicum boscii</i>
9. Rib Grass	<i>Panicum yadkinense</i>
Sheep Sorrell	Paspalum
Sweet Vernal Grass	10. Giant Ragweed
13. Black Gum Tree	Wild Rice
16. June Grass.	15. Bur Marigold
18. Curly Dock	Pigweed
Mock Orange	17. Short Ragweed
Tree of Heaven	September
20. Orchard Grass	4. Wormseed
Perennial Rye Grass	10. Wormwood
30. <i>Sphenopholis obtusata</i>	October
	5. Purple Top
	14. Eulalia

It is a pleasure to record my indebtedness to the several members of the United States Department of Agriculture—Miss P. T. Newbold.

Drs. W. W. Stockberger and C. E. Chambliss, and Mr. H. A. Allard—whose co-operation has made this investigation possible. I desire especially to thank Mr. Homer C. Skeels who has so generously given of his time and rich experience to me in the field.

The expense involved in these studies has been defrayed by a grant from Mrs. Charles W. Wetmore, President of the Woman's Welfare Association. In expressing my thanks to Mrs. Wetmore, I feel that I am voicing the gratitude of the many beneficiaries of the institution which owes its usefulness to her unflinching interest.

THE CLINICAL SIGNIFICANCE OF REDUCTIONS IN THE WHITE CELLS OF THE HUMAN BLOOD.*

By WYNDHAM B. BLANTON, M. D., Richmond Va.

Variations from the normal in the human blood picture have, naturally, great significance in the study of disease. In the past much has been made of changes in the red cells as well as of leucocytosis. On the other hand, little attention has been paid to reductions in the white corpuscles, leukopenia, or hypoleucocytosis as some prefer to call it. This lack of interest has been voiced in assertions such as Todd's¹ "that leukopenia is not important." Catton² exemplifies the other extreme, tabulating seventy odd causes. This paper is directed to a discussion of the background, mechanism and clinical significance of leukopenia.

The bone marrow represents the scene of manufacture of the white cells in adult life. In the embryo, the liver, lymph nodes, and spleen are active blood forming centers. In early life the whole of the marrow cavity of all bones is devoted to this function. After puberty, fat occupies most of the shaft of the long bones so that blood formation, exclusive of the mononuclear series, is confined to flat bones and to the head of the long bones.

The architecture of the bone marrow is better understood than formerly. Drinker³ claims to have demonstrated closed sinuses in the marrow. He lays particular stress upon an inflexible bony case which permits of the proper functioning of a delicate reticulum binding the various islands of the blood form-

ing cells, as well as upon the closed nature of the wide sinuses with their sluggish blood stream into which the mature blood cells are pushed in response to the stimulus of growth in a non-expanding bony case.

The output of the bone marrow undoubtedly varies in response to inhibitory and acceleratory influences. What the stimulus of growth is, is as yet undetermined. Whether it is mechanical or nervous in origin is undemonstrated. Its specificity, however, is certain. The polycythemia of lowered barometric pressure (mountain residence) is accompanied by a fall of the leucocyte count. The response of the blood picture to intestinal parasites, the failure of response in such diseases as syphilis and the lymphocytosis of whooping-cough and mumps bespeaks a similar specificity of stimulus. Chemotactic influences undoubtedly determine the migration of cells in the human body. Catton² states that certain bacteria, or their extractives, copper, mercury, and the extracts of dead leucocytes have a positive chemotaxis for the polymorphonuclears but not for the mononuclears. In the peritoneum the live bacillus of anthrax, or bacilli coli are unattacked by polymorphonuclears; these organisms injected dead are quickly ingested. Organisms and different species of organisms elaborate different toxins, which undoubtedly have varying effects upon the body tissue, particularly the bone marrow.

In the normal human count there are 6 to 10,000 white blood cells per cubic millimeter. Sixty-five to seventy per cent. of these should belong to the granular series. There is, therefore, a moderate fluctuation in health of the leucocytes of the human blood. Posture, altitude, emotion, all influence this side of the blood picture. A count lower than 6,000 leucocytes is usually considered leukopenia.

The function of the polymorphonuclear leucocyte is elaborate. Briefly, these cells offer a line of defense against bacteria by ingesting them, or by elaborating antibacterial substances formed either as a secretion or as a result of going to pieces after injury. They are concerned with the transportation of food material. They convey protein, glycogen, fat and proteolytic ferments. In terms of the function of the leucocyte, therefore, leukopenia may handicap the body in more than one way.

*Read before the Richmond Academy of Medicine and Surgery, September 12, 1922.

THE MECHANISM OF LEUKOPENIA.

Adami⁴ points out that reductions in the leucocytes of the peripheral blood stream may result from one of two causes. There may occur an actual destruction of the white corpuscles in the tissues, blood stream or bone marrow. This he calls leucolysis. On the other hand, a similar blood picture may result from "local accumulation." In this event a migration of leucocytes from the peripheral blood to the internal organs accounts for the blood picture. That such migrations do occur has been proven both experimentally and clinically. Opie⁵ demonstrated in peritonitis massive accumulations of eosinophiles in the omentum and mesentery.

Löwett⁶ pointed out in 1892 that the products of protein decomposition, bacteria or their autolysates may cause leukopenia followed by leucocytosis. Pepper and Miller⁷ unsuccessfully attempted to demonstrate in rabbits that there was an increase in the nitrogen fraction in the urine synchronous with leukopenia. Löwett's⁶ original contention was that cell destruction was responsible for cell loss. Goldscheider and Jacobs⁸ in 1892 explained leukopenia on the basis of the withdrawal of leucocytes from the peripheral blood. Silverman⁹ in 1904 maintained that the swelling of the endothelial cells by producing obstruction in capillaries accounted for the accumulation of leucocytes in the internal organs. Bruce and Ewing pointed out this accumulation. Wells¹⁰ in an elaborate series of experiments on rabbits showed that, by injecting dead typhoid bacilli intravenously, marked leukopenia occurred as early as ten minutes after injection. On killing his animals during such leukopenias he was able to demonstrate the accumulation of both bacteria and leucocytes in the liver, spleen and lungs. He considered this evidence of a positive chemotaxis, bacteria being entangled in these localities to await the mobilization of leucocytes.

Leucolysis appears to be well established. Adami⁴ quotes Albertoni who showed the destructive power of pancreatin upon leucocytes. Likewise, he states that bile salts and bacterial poisons are destructive to the white cells. The leucolytic effect of benzol is well-known in the diphasic leukopenia of animals and the marked changes in the blood picture of human leukemia. The result is a marrow which is practi-

cally nothing but yellowish fat. Krumbhaar¹¹ reports similar findings in certain types of gas poisoning. Catton² quotes Emerson and others to show that exogenous intoxications such as mercury, arsenic, lead, alcohol, morphine, ether, ergot, tannic acid, atropine, picrotoxin, sulphonol, curare, quinine, diastase and trypsin cause reductions in the white corpuscles. The emanations of radium and the X-ray likewise affect harmfully the leucocyte.

The failure of leucocytosis without an actual reduction of the number of leucocytes, in the face of all the evidence of a severe infection, has to be considered also in this connection; for example, a normal blood count in the presence of a demonstrated typhoid infection. In such a case I do not believe that either leucolysis or local accumulation accounts entirely for the finding. It is customary to state that the toxin of the typhoid bacillus has a specificity for the bone marrow, paralyzing its output. MacCallum¹² states that a mild stimulus to the bone marrow produces proliferation, whereas a violent poison, such as a severe infection, may produce leukopenia from an overwhelming of the marrow. It appears to me that the most logical explanation in such cases lies elsewhere, despite the pathology of the bone marrow in typhoid fever. In the first place the mortality from the typhoid infection is not distinctly different from the mortality of a pneumococcus infection. Now, if the body's resistance to both infections equally depended upon the numerical strength of the so-called standing army of the leucocytes, typhoid fever ought to be a far more fatal disease than pneumonia. There are undoubtedly means of defense at the disposal of the body other than the white cell. The method of defense lies in such substances as precipitins, agglutinins, lysins, etc. Now, in such a disease as typhoid fever in which the blood stream is not crowded with leucocytes, may it not be that the normal method of defense depends upon such other substances as we have enumerated? Good evidence against the fact that such an infection as typhoid fever produces a leukopenia by paralyzing the bone marrow lies in the well-known fact that when perforation occurs and secondary invaders, or organisms whose infection is commonly characterized by leucocytosis, gain entrance to the body, leukopenia gives way to leucocytosis.

Finally, a fourth mechanism may be operative in causing leukopenia. Physical encroachment upon the blood forming tissue of the bone marrow by tumor formations, such as the metastases of hypernephromata, or the crowding in of mononuclears as in kalaazar may be the cause. From these facts, therefore, it seems allowable to enumerate four processes through which leukopenia develops:

1. Leucolysis.
2. Local accumulation.
3. Specific failure of stimulation of bone marrow.
4. Physical encroachment on the bone marrow.

CLASSIFICATION OF LEUKOPENIA.

Reductions of the white cells of the blood may occur under the following conditions: 1. Leukopenia in diseases which it normally characterizes. 2. Leukopenia in diseases which should give leucocytosis, usually a grave occurrence. 3. Leukopenia occurring during leucocytosis with the other signs of disease unabating,—this always portends an unfavorable outcome. 4. Leukopenia suddenly giving place to leucocytosis, as for example when secondary invaders complicate typhoid fever.

DISEASES CHARACTERIZED BY LEUKOPENIA.

Typhoid fever, best known of the leukopenic diseases, has a very definite blood picture. A relative lymphocytosis with absence of eosinophiles occurs during the second or third week. A steady drop in the polymorphonuclear neutrophiles, characterizes especially the third and fourth week. So important is the drop in eosinophiles that Stitt¹³ maintains that an increase in them negatives a diagnosis of typhoid fever, and Sahli¹⁴ quotes Nageli saying that a few of these cells cast suspicion on such a diagnosis.

Influenza: In a series of 1,600 white cell counts made by me¹⁵ in 1918, seventy per cent. showed less than 8,000 leucocytes per cu. mm. during the prepneumonic stage. In the pneumonic stage, the counts were even lower, twice as many ranging under 6,000. This failure of leucocytosis in influenza in the presence of the secondary invaders of pneumonia is sharply opposed to what occurs under similar circumstances in typhoid fever. Leucolysis, or bone marrow paralysis, is therefore probably operative in influenza.

Tuberculosis: Acute invasions by the tuber-

cle bacillus, especially in miliary tuberculosis, are often characterized by leukopenia. Williamson¹⁶ recently emphasized this, citing a case with positive Widal, the symptoms of typhoid fever, and a blood count of 6,000 leucocytes. On account of the rapid pulse and respiration, a diagnosis of miliary tuberculosis was made. This was confirmed by autopsy. In chronic pulmonary tuberculosis, interest has centered about the lymphocyte and prognosis has been made in terms of these cells. It is important to recall that the relative increase of the lymphocytes is almost a regular occurrence in leukopenia.

Malaria: Leukopenia in this disease is accompanied by a relative increase of large mononuclears and a remarkable accumulation of pigment in the white cells. Thompson¹⁷ states that leukopenia is characteristic of the severer infections and is proportionate to the number of plasmodii. Wells¹⁰ considered the enlargement of the spleen the result of polymorphonuclear accumulation at this site in response to a positive chemotaxis. A typical count shows about 5,000 white cells per cu. mm.

Measles: Following a transient leucocytosis during the incubation period, a well marked leukopenia is the usual blood picture. The diminution of the lymphocytes is the chief cause of the low count. Counts from 2,500 to 8,000 leucocytes are common.

German Measles: This mild infection is likewise accompanied by a low leucocyte count.

Kala Azar: A striking reduction in white cells occurs in this tropical disease and is interesting chiefly because of the mechanism of its production. There is no toxemia as Lavarin¹⁸ showed, but the parasites invade the endothelial cells all over the body. Especially is this true in the bone marrow. The diffuent marrow is largely composed of such parasite-laden mononuclears. Leucocyte production, therefore, is seriously compromised. Leukopenia in this disease appears to be dependent upon the failure of the bone marrow whose endothelial elements have suffered an overwhelming blow.

Malta Fever: Another tropical disease with a moderate reduction of white corpuscles.

Dengue: A disease characterized by marked leukopenia and relative increase of the mononuclear cells. The average leukocyte count in

this disease is about 3,500. Counts of 1,000 are not rare.

Trypanosomiasis: Slight leukopenia occurs in this infection with increase of the large mononuclears.

Severe Pyogenic Infections: An extraordinary case was recently observed in a man of about sixty years, suffering from an unexplained temperature of 101 with a slightly red and sore throat and prostration of a marked degree. There were no definite focalizing symptoms or signs. The blood count showed 1,340 white cells with an entire absence of polymorphonuclears. Ten days later, redness and swelling, followed by fluctuation was noted in the side of his neck. Pus laden with hemolytic staphylococci was evacuated. The subsequent course was one of multiple abscesses and eventual recovery. With the appearance of the physical signs of local inflammation the blood picture changed to normal. This might be cited as an illustration of an extreme leucolysis due to specificity of a bacterial poison for white cells in the blood stream and in the bone marrow. The absence of the local signs of inflammation may have been due to a complete breakdown in the polymorphonuclear supply. Therefore, since the essential element of pus formation was lacking no pus was formed during the early stage of the infection.

Another explanation has to be considered. Zinsser¹⁹ demonstrated leukopenia following the injection of dead typhoid germs into rabbits, and Miller showed the same thing in men following typhoid vaccination. It has also been pointed out by Wells¹⁰ that the injection of bacteria into animals is often followed by a rapid filtering out of these organisms into the liver and other internal organs. Leukopenias, therefore, under such circumstances may represent temporary withdrawal of circulating white cells for central mobilization where circulating bacteria are also arrested and await destruction by leucocytes. It may, therefore, be possible that in this instance an initial bacteremia carried the conflict to the internal organs with the withdrawal of peripheral leucocytes. A corollary of this is to be observed in certain infections with or without bacteremia accompanied by sudden and striking changes in the blood picture characteristic of leukopenia. The probable explanation of such an occurrence again lies in the fact that

there has been a new or a fresh shower of bacteria into the blood stream and the conflict again is central and not peripheral.

AFEBRILE LEUKOPENIA.

Pernicious Anemia: A disease of abnormal blood destruction as evidenced by urobilin in the feces and urobilinogen in the urine. Likewise, there is an abnormal blood formation with a red overworked marrow trying to make good the loss. In such a heated erythroblastic effort to produce cells there is little room or time for the making of leucocytes; hence leukopenia. The index of progress often lies in the fluctuation of the white corpuscles.

Leukemic Leukemia: Is also known as leukopenic leukemia.

A typical count in the disease:

Hgb.	47	Myelocytes	6.5
Rbc.	3,030,000	Myeloblasts	3.5
Wbc.	5,900	Monocytes	45.
P.	42		

Banti's Disease: A typical count in this disease:

Hgb.	55	P.	55
Rbc.	3,300,000	S. L.	38
Wbc.	4,000	L.	10

Chlorosis: The leukopenia of this disease does not occur early. It is accompanied by the usual picture of a low index in the presence of a good erythrocyte representation. It is probably an index of marrow inactivity.

Aplastic Anemia: A leukopenia occurs with low reds and platelets. Bone marrow cells in the peripheral blood are very rare. In this disease there is blood destruction in the bone marrow without evidence of regeneration.

Myelophthisic Anemia: In this condition tumors in the bone marrow leave as little room for leucocytes as they do for red blood cell formation. Myelomata, sarcomata and the metastases of hypernephromata all have this effect.

Simple Chronic Anemia: No evidence of blood destruction is to be observed. Leukopenia here is accompanied by a low color index, reduced red cells, and usually a discoverable cause such as defective diet.

Hemophilia: Leukopenia in this disease, of course, occurs only in the male sex.

AFEBRILE LEUKOPENIA OF UNDETERMINED ORIGIN.

An analysis of 1,025 recent routine blood examinations made on office patients revealed in eighteen cases unaccountably low white cell

counts. In most instances, the leucocytic reduction was striking. The highest count was 5,200 and the lowest was 2,700. In about half there was a definite accompanying anemia. The differential count was not remarkable. There were no bone marrow cells noted in the peripheral blood. In nine cases subsequent counts showed continuance of the leukopenia. In one instance, there was a count of 4,800 white, which two years later was 3,500. This patient's sister was subsequently examined and

This is probably, therefore, a chronic idiopathic leukopenia. It may represent an inherited bone marrow deficiency. An instance was noted of similar findings in brother and sister. The same factors may be operative here as have been brought forward to explain simple chronic anemia. It may lie in a food deficiency, though probably not iron as in the case of anemia. Or there may be some hidden intoxication with a specificity for this element of the bone marrow. The whole appearance

TABLE IDEOPATHIC LEUKOPENIA.

No.	Age.	Sex.	WBC.	P.	L.	RBC.	Hgb.	B. P.	Chief Complaint.	Physical.
1	56	M	3300	50	50	4,480,600	92	110\65	Headache.....	Frail
2	10	F	4500	39	61	4,090,000	75		Intestinal Upsets.....	
3		F	4000	55	45	3,500,000	70	100\60	Skin Eruption.....	
4	8	M	3200	54	46	3,800,000	75		Lassitude, Catarrhal Jaundice.....	Frail
5	23	F	4000	59	41	4,090,000	80	100\60	Pain in Stomach, Nervousness, Weakness.....	Frail
6	37	M	4000	63	39	4,600,000	90	90\70	Pain in Stomach, Tired, Nervous.....	Frail
7	17	F	4400	59	41	4,040,000	80	120\80	Headache, Nausea, Constipation.....	
8	22	F	5100	71	29	4,650,000	95	115\80	Headache, Nervousness.....	
9	37	F	4400	72	28	3,430,000	70	125\80	Weakness, Bronchitis.....	
10		F	5200	42	58	5,700,000	80		Nervous.....	
11	62	F	4400	49	51	4,500,000	90	128\80	Nervous, Easily Tired, Backache.....	
12	16	F	3000	54	46	3,570,000	70	84\45	Tires Easily.....	Frail
13	26	M	2700	45	55	4,260,000	85	125\65	Herpes Zosta.....	
14	24	F	4800	59	41	5,000,000	100		Nervous, Easily Fatigued.....	Frail
15	62	F	3900	65	35	4,210,000	86	75\85	Bronchitis.....	
16	46	F	5200	68	32	4,010,000	90		Nervous, Easily Tired, Cries.....	OK.
17	39	F	4000	76	24	4,400,000	75	125\75	Nervous, Overworked, Ptosis.....	Frail
18	44	F	5000	61	39	4,550,000	86		Nervous, Constipated, Deaf and Dumb.....	Frail

showed a leukopenia of 3,900. The comitant findings in these cases were usually low blood pressure, slight anemia, marked nervousness with the chief complaint of ennui and lassitude.

of the patients strongly suggests such an intoxication.

It is interesting to speculate upon the reaction of such individuals to infections ordinarily characterized by leucocytosis. Doubt-

less, many of them meet such infections with the usual blood picture. Others probably cannot and the suspicion of miliary tuberculosis, typhoid fever or influenza makes diagnosis difficult. Catton,² in a series of articles in 1916-1917, develops this phase of the subject in relation to orchitis, bronchitis and neuralgia. He showed that those diseases in which orchitis, bronchitis and neuralgia were complications were likewise characterized by leukopenia. It was his opinion that a pre-existing leukopenia foreshadows this condition, or that an existing leukopenia shows that a tendency to these diseases exists. He cites a case with abnormally low leucocytes in the blood which had successively seven infectious diseases, six of which were diseases which are characterized by leukopenia. He further suggests that a leukopenia "may be most significant as an indicator of tendency toward disease."

LEUKOPENIA IN DIAGNOSIS.

In the presence of temperature, a reduction in the leucocyte count suggests enteric fever, influenza, miliary tuberculosis, malaria, measles, or an overwhelming acute infection. In differentiating the common febrile leukopenias, in the absence of more definite physical signs and laboratory data, the season of the year, pulse, temperature, respiration or eosinophile count may be the deciding factor. Among the uncommon causes of febrile leukopenia in this climate are dengue, trypanosomiasis and other tropical diseases. Concerning them we need speak no further.

Almost as common are the leukopenias unaccompanied by pyrexia. It is well in such cases to inquire into the drug history of the patient. Quinine²⁰ produces striking leukopenia. Arsenic²⁰ may also result in leukoblastic destruction of the bone marrow as was the case in the Manchester epidemic of 3,000 cases. Benzol likewise is a familiar cause of white blood cell destruction. Catton² enumerates many other drugs, such as morphine, atropine, alcohol, curare, sulphonol, lead and mercury. If these latter drugs do produce leukopenia they are far less important than the others first enumerated.

The leukopenia of the various blood dyscrasias must be recalled and classified according to their respective blood picture findings. Recent vaccination must be considered. Malnu-

trition, exhaustion, hay fever and disturbances of the glands of internal secretion must be borne in mind, and the familiar symptom-complex of each sought for. Finally, having encountered none of the etiological factors enumerated above, we must put many cases of leukopenia, in our own experience eighteen in 1025, into a cryptogenic category until we gather enough information for a more satisfactory classification.

SUMMARY.

The leucocyte and its relation to the bone marrow has been discussed, the mechanism and classification of leukopenia pointed out, the diseases in which it occurs enumerated, and its diagnostic significance emphasized.

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300 West Grace Street.

EYE PATHOLOGY OF DENTAL ORIGIN.*

By W. W. GILL, M. D., Richmond, Va.

Associate in Ophthalmology, Medical College of Virginia.

While offering nothing new in presenting these remarks, the writer has chosen this subject on account of the frequency with which inflammatory conditions of the eye have been accompanied by oral infection especially about

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the teeth. And it is the writer's desire to impress you with the relative importance of such infections as a possible cause of diseases of the eye which you see every day, perhaps eight times more frequent than the tonsils as a causative factor,—and the tonsil has no mean reputation as a trouble starter. The above proportion is the writer's experience.

Inflammatory conditions of the uveal tract have long been considered secondary. And of iritis, de Schweinitz states that it is always secondary, while on the other hand most authorities consider infected and sloughing ulcers as of local origin. And well can the writer remember these cases: the local care, the bacteriological examinations, the hot applications, the cautery, the frequent irrigations, instillation of atropine, antiseptics, and what not. They lingered for weeks and months, some finally getting well in spite of treatments; others going on to blindness or panophthalmitis.

The writer is not decrying the old methods as aids, but of vital importance is the establishment of the primary cause, the pneumococcus, the streptococcus, the staphylococcus. Perhaps they are present, one or all, and it is well to know which, but where did they come from? What was their origin?

In the cases which will be cited, the practical results obtained, from assuming abscesses at the roots of teeth to be the primary cause or focus, have been infinitely better than those in which medication or surgery was directed to the eye alone.

CASE 1. Mrs. C. G. W. Ulcer with hypopyon. Called to see this lady Sunday afternoon, January 26th, 1921. A sheet of newspaper had scratched the eye three days previously and the pain grew steadily worse in spite of physician's attention. A dense infiltration of cornea just below center was noted, the eye was extremely red, and hypopyon present, though small. The teeth were found to be in bad condition, and immediate removal of infected ones suggested. Patient at first demurred, but was told that it was only on this condition that the case would be accepted. Copy of report was as follows.

X-ray findings: The following teeth are non-vital and have infection of the alveolar process about them: lower right lateral and left central, lower left cuspid and first bicus-

pid, upper left cuspid and first bicuspid, and upper right cuspid.

Extraction was begun immediately on receipt of report, and after each a reaction was noticed. Reaction was indicated by temporary increase in size of hypopyon and local eye congestion. Culture from apex of teeth showed staphylococcus and streptococcus. A guinea pig injected died in forty-eight hours with intestines inflamed and pus in the abdominal cavity ($\frac{1}{2}$ cc. suspended culture used). After the first extraction reaction was very severe, and hypopyon larger. But in this case there was not enough exudate in the anterior chamber to justify opening. The cornea was slit through the dense infiltrated area. After the second extraction recovery was rapid and uneventful, vision at discharge being 20/20.

CASE 2. Miss S. L. age 26. First seen May 15th, 1920.

Left eye, retinal detachment, tension and irritable.

Right eye, patches of choroiditis.

Wassermann, negative; very anaemic, history of hookworm infection and examination of stool showed hookworm still present. Tonsils diseased, also evidence of trouble around roots of teeth.

Treatment: Left eye enucleated. One week later tonsils were removed.

Right choroidal patches did not involve macula. Vision, with correction, 20/20. Went home for hookworm treatment by her physician in North Carolina.

August 6th, 1920, the patient returned on account of sudden and marked diminution of vision; had to be led about, could count fingers at a few feet. Examination showed fresh exudation into the vitreous. Hookworm negative. She was put to bed, eliminative treatment instituted, and conjunctival injections given. Responded well and returned home.

On April 1st, 1921, patient returned to hospital with a relapse. At this time vision was reduced to 20/100. On re-examination I found that although work on teeth had been advised, it had not been attended to, so she was referred for X-ray examination of teeth.

X-ray findings: There are slight indications of pyorrhea present in the mouth, more extensive in the molar regions. Upper right first bicuspid non-vital, small area of periapical infection. Lower right second molar devitalized, slight periapical infection of anterior root.

Lower left first molar devitalized, slight periapical infection involving both roots. Lower left second molar devitalized, but free from X-ray pathology at present time. Such extractions as were necessary were done.

She left the hospital on April 27th: vision 20/50, nearly all exudate absorbed, and has had no recurrence to this day. Was last seen on December 11th, 1921. Vision 20/20. In this case I believe the causative condition was hookworm and infected teeth.

CASE 3. R. L. B. Age 40. Housewife. December 1920. Recurring superficial ulcers of cornea, single at times, at others multiple; sometimes one eye, at others both. Very painful and resistant to ordinary methods of treatment. Gone over by internist; negative history except trace of albumen and occasional pus cells in urine. Was dieted and tested for protein reaction with negative results. These ulcers would appear very suddenly.

After treating this case through several relapses for a period of many months, an X-ray of the teeth was advised, although they appeared perfect. The result was that two were so badly infected that they had to be extracted, another was treated. A severe reaction was noticed in the eyes after the extraction of each tooth. Extraction took place six months after the first appearance of the ulcers, which was in June, 1921. Since then there have been only two recurrences, and these have been very mild, lasting only a few days. This case was last seen September, 1922.

CASE 4. T. J. F. Male. Age 48. Occupation, farmer. Admitted to the hospital December 3rd, 1920.

Hypopyon in right eye, filling more than half of anterior chamber. Three weeks previously had gotten foreign body in eye which was removed at home by local doctor. In a few days the eye was painful, and sight gradually left. At time of admittance vision was limited to light perception. Large hypopyon filling half of anterior chamber.

Treatment. Cornea incised with keratome, and hypopyon evacuated. Very little reaction. In twenty-four hours pus formed again, and was again let out. As teeth showed evidence of pronounced infection, he was sent to a dentist who reported as follows:

X-ray findings. Very few teeth in the mouth and those present are in bad condition. The following teeth, most of which were pieces of

roots, had periapical involvement: upper right lateral incisor, upper left cuspid, lower left central incisor, lower right and left lateral incisors and right cuspid, lower left first bicuspid and first molar. The periapical infection around most of these roots involved a small amount of the process, but the upper left cuspid had a large rarefied area.

Considerable reaction in eye followed extraction, but this soon cleared and improvement thereafter was rapid. The usual local treatment was resorted to in addition to the above. When he left the hospital on December 20th, his vision was 20/200. A letter received some months later stated that vision was good in infected eye.

SUMMARY: In this case the exciting cause was injury; the underlying cause, focal infection. I attribute the remarkable result in this case to early surgical intervention in mouth.

CASE 5. Mrs. C. E. M. Chester, Va., 65 years of age. March 1919. Complaining of floaters in right eye, and blurring of vision.

Examination showed vision right, with correcting lens 20/20. Left eye, with correction 20/40.

Ophthalmoscopic examination showed opacities in vitreous and beginning lenticular opacities of radiating variety. Teeth were bad and all such as remained were extracted. Tonsils diseased and were removed. General health improved. No opacities noted and process of lenticular change checked. This was in August 1921, also vision in left eye was 20/30.

CASE 6. J. G. S. 50 years of age. Male. Married. First seen in August 1913. Right eye detached retina and inflammatory symptoms. Left eye showed signs of sympathetic irritation. Immediate removal advised and assented to. Left eye cleared up, but indiscretions in diet brought about much discomfort in left eye. Urine, negative. Wassermann, negative.

June 1914. Pain worse in left eye and vision reduced to 15/30. Small patch of exudative choroiditis seen. This responded to eliminative treatment, associated with usual local treatment. He was warned again about diet and habits.

Returned in August of same year with ciliary infection, discomfort and pain. At this time he stated that there was undue sensitiveness about one of his teeth, which he noticed while

chewing some taffy candy. The tooth was extracted and abscess found at root. That was in August 1914. No X-ray was taken. From that time to December 8th, 1921, eye was impervious to indiscretions of any sort although patient is a high liver.

December 8th, 1921, seven years later, patient stated that he thought his glasses needed changing as his eye had been uncomfortable of late. I suggested as he had only one eye, an X-ray of his teeth.

X-ray report: Upper right first bicuspid has periapical granuloma. Upper left second bicuspid has periapical infection. Upper left cuspid is deeply impacted. Lower right second bicuspid has periapical infection. There is considerable pyorrhea about the other teeth in the mouth. In this case, I am positive that dental pathology caused the loss of right eye and very nearly cost loss of left.

Many cases of sties, iritis episcleritis, and other manifestations of infection in or about the eyes might be cited, but if these remarks will impress you with the necessity of an oral examination in connection with eye pathology, then the object of this paper will have been accomplished. Somehow, the writer has found of late every few cases of tuberculosis of the eye since conversion to the theory of focal infections, and he is constrained to believe that many such cases, in fact a majority, were erroneously diagnosed back about 1907 or shortly after Calmette and others gave us easy methods of diagnosing tuberculosis.

As a prophylactic measure, before any eye operation (or other for that matter) eliminate focal infections. All of you have wondered why dirty operators seem to get as good results as clean ones. It is because they were operating on clean subjects. Of course, the combination of clean operation and clean subjects is the most desirable.

Recently the writer has been having the teeth and tonsils examined, also other possible foci eliminated before operating for foreign bodies in the vitreous, cataract, glaucoma, etc.

Chiropractic Bill Killed in South Carolina.

After a long and stormy debate, the bill to create a state board of chiropractic examiners in South Carolina was finally killed in the House of Representatives. The final vote was 65 to 46 against the bill. This action of the House was considered a hard blow to chiropractic in that State.

BRAIN ABSCESS OF TEMPORO-SPHENOIDAL LOBE COMPLICATING ACUTE MASTOIDITIS: OPERATION: RECOVERY.*

By ELBYRNE G. GILL, M. D., Roanoke, Va.

PATIENT—L. L. B., female, age forty-one, came under my observation April 22, 1922, complaining of deafness in left ear. This symptom was preceded by a "cold."

PAST HISTORY—No previous history of ear trouble. Has had the diseases of childhood. Was in a tubercular sanitarium for treatment eight months, five years ago. Has had no further trouble.

SPECIAL EXAMINATION—*Nose*—negative. *Throat*—tonsils small, submerged and diseased. *Ears*—A. D. normal; A. S. Membrani tympani thickened and slightly congested. *Sinuses*—Maxillary and frontal all clear to transillumination. Functional examination:

	Whisper	Weber	Schwaback	Rinne
Right Ear	25 Ft.	—	—	+
Left Ear	3 Ft.	+	+	—

	Lower Tone	Galton Whistle	
Right Ear	C- 32	.2	Fistula
Left Ear	C-128	.2	Negative

DIAGNOSIS at this time: Tubo-tympanic congestion following acute rhinitis.

Four days later, April 26th, I was called to see the patient and on examination a bulging left ear drum was revealed. The patient was suffering most excruciating pain. The ear drum was incised under local anesthesia, pus escaped under pressure. Examination of smear revealed pneumococcus infection. Patient was treated for acute middle ear suppuration and did not have further trouble until April 30th, (four days later), when she begun having severe pains in left ear. At this time there was slight tenderness, on pressure, over the mastoid antrum and tip. The aural discharge was thick and profuse.

As I was leaving the city at this time for a few days, my colleague, Dr. G. M. Maxwell, kindly consented to look after the patient. The patient's condition grew progressively worse and on Wednesday morning, May 3rd, Dr. Maxwell sent her to the hospital for X-ray examination, preparatory to doing a mastoidectomy. The X-ray report is as follows:

*Read at the sixteenth annual meeting of the Southern Medical Association in Chattanooga, Tenn., in November 1922.

"X-ray examination of left ear shows a definite increased density and cloudiness of the mastoid. The cells do not appear to be completely broken down, but there is a definite involvement, and this case should be carefully watched clinically, with an idea of early operative procedure."

After receiving this report and noting the severity of the clinical symptoms, operation was advised. Patient refused and left the hospital the same day of admission, May 3rd. I returned to the city May 6th and visited the patient at home, and found the condition as follows: Pulse and temperature normal, profuse ropy discharge from ear, no pain, tenderness only on pressure over mastoid tip emaciation noticeable, pupils equal in size and react to light, no spontaneous nystagmus, eye grounds negative, apparent cloudiness of sensorium. Patient was urged to return to the hospital for another X-ray examination but refused. Family was advised to notify me if any unfavorable symptom developed. The following morning, May 7th, 5 a. m., I received a telephone call stating that the patient was unconscious and having convulsions. On reaching the home I found the patient unconscious. Rotary nystagmus to the right was noticed. The patient was hurried to the hospital, spinal puncture performed immediately. Fifteen cc. of fluid withdrawn. First fluid was blood tinged. Last only faintly cloudy. Cloudiness due to blood. Blood count: 3,480,000 red blood cells, a hemoglobin 60 per cent, white blood cells 22,600, 90 per cent. neutrophils, and 10 per cent mononuclears. Urine negative.

Sudden development of this unfavorable symptom prevented a satisfactory neurological and Barany examination; consequently we were not able to localize any definite lesion. Temperature on admission, 100 degrees F, pulse 100, respiration 18.

With a history of suppurating middle ear and mastoiditis for the past ten days, followed by sudden development of unconsciousness and a negative spinal fluid and urine, we made a tentative diagnosis of an abscess of the temporosphenoidal lobe.

The family was advised accordingly and after much persuasion we were permitted to operate.

Patient prepared as usual for mastoid operation. (Ether anesthesia). Profound coma

when sent to operating room. Simple mastoidectomy was performed. Small amount of

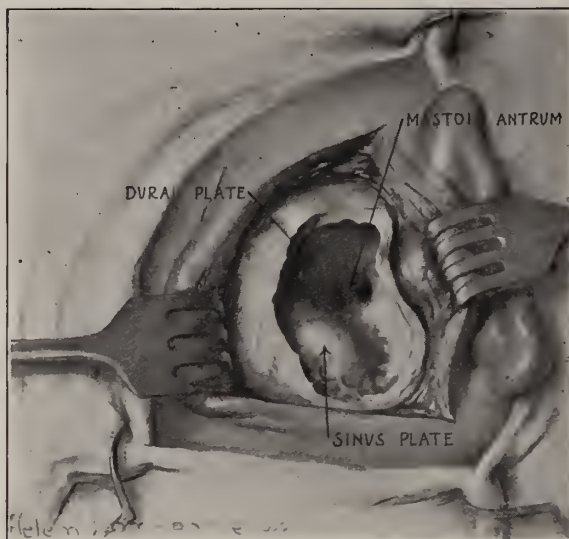


Fig. 1.

pus escaped when the mastoid cortex was removed. No pus in antrum, tip or over the lateral sinus. The lateral sinus was uncovered from the knee to the sigmoid. Color normal. No evidence of necrosis of bone covering sinus. Cerebellar dura normal in appearance. Nothing found so far to account for the symptoms present. The dura in the middle cranial fossa

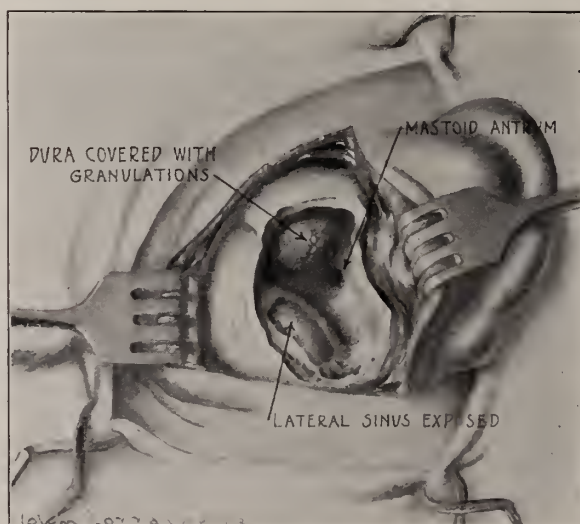


Fig. 2.

was uncovered to the extent of a twenty-five cent piece. The dural plate was intact. No evidence of necrosis. (The dura was red, congested and covered with granulations,

bulging very slight, if any). No pulsation. It was not adherent to the bony wall.

All instruments used in operation were removed from table, gloves changed, mastoid cavity swabbed with iodine, full strength. The dura was incised in the middle fossa. Knife inserted into brain to the depth of two inches. No pus escaped. I then opened the incision by spreading apart a pair of forceps; when this was done, about two ounces of unorganized pus escaped under pressure. The pus had no odor and there was apparently no abscess wall. Culture showed pneumococcus infection.

A small rubber cigarette drain was then inserted into the brain cavity and held in place by packing placed around it in the mastoid cavity. Mastoid wound left open. Dressing applied and patient sent back to room in good condition. Temperature 100.4. Pulse 120. Respiration 24. Time of operation one hour and thirty minutes.

Four hours following operation patient regained consciousness and subsequent history was one of gradual improvement. First two weeks following operation patient had marked word aphasia and weakness of muscles of right arm persisted for nearly three months.



Fig. III.

When drainage tube should be removed was a question of paramount importance. At the end of the first week the discharge from the tube was every slight and of a serous nature and in view of these findings together with

the improvement of the general condition prompted me to remove the tube. On the following day patient complained of severe headache and there was a beginning cloudiness of the sensorium. Dural incision was again opened with forceps and dark blood-tinged pus was evacuated. A small male catheter was inserted into the cavity and allowed to remain until May 25th, nearly three weeks following the operation. The tube was not changed but twice during this period and then on account of the dressing slipping.

The anemia which was present at the time of admission continued to become more marked, as shown by the following blood pictures.

May 8.	Red blood cells	3,480,000
	Hemoglobin	60%
	White blood cells	22,600
	Polynuclears	90%
	Mononuclears	10%
May 22.	Red blood cells	3,080,000
	Hemoglobin	45%
	White blood cells	10,000
	Polynuclears	80%
	Mononuclears	20%
May 24.	Red blood cells	3,420,000
	Hemoglobin	50%
	White blood cells	9,400
	Polynuclears	76%
	Mononuclears	24%
May 26.	Red blood cells	3,600,000
	Hemoglobin	55%
	White blood cells	8,800
	Polynuclears	77%
	Mononuclears	23%
May 30.	Red blood cells	3,480,000
	Hemoglobin	55%
	White blood cells	7,800
	Polynuclears	76%
	Mononuclears	24%
June 2.	Red blood cells	2,800,000
	Hemoglobin	50%
	White blood cells	5,400
	Polynuclears	65%
	Mononuclears	35%
June 8.	Red blood cells	2,440,000
	Hemoglobin	50%
	White blood cells	6,000
	Polynuclears	68%
	Mononuclears	32%

At this time blood transfusion was decided upon as the most effective means to combat the progressive anemia. A suitable donor was selected and a transfusion of 250 cc. of blood was given, June 10th. A very severe reaction accompanied the transfusion. Blood count June 15th as follows:

Red Blood cells	4,360,000
Hemoglobin	65%
White blood cells	7,800
Polynuclears	70%
Mononuclears	29%
Eosinophiles	1%

Patient's general condition very much improved, mastoid wound practically healed and she was discharged from hospital June 18, 1922.

This case is of unusual interest in that we had the rapid development of an abscess to quite a large extent without any focalizing symptoms for the patient. As late as 10 p. m., May 6th, was feeling quite well and talking with neighbors and members of the family. Seven hours later she suddenly became unconscious and begun having recurrent convulsions. We attribute our success in this case to the following factors: **FIRST**, that the abscess was evacuated without undue trauma to the cerebral tissue. **SECOND**, that the drainage tube was allowed to remain in situ continuously and not removed daily as this manipulation would tend to break down nature's barriers, thus having a tendency to spread the infection. The time to remove the drainage tube depends upon the individual case. It may vary from one week to three months, depending upon the character and amount of discharge. If it no longer contains pus and is of a serous nature, the tube may be removed. **THIRD**, that the patient was kept in bed, on back, for four weeks following operation.

612 MacBain Building.

Proceedings of Societies

Constitution and By-Laws of the Woman's Auxiliary to the Medical Society of Virginia.

As Tentatively Submitted for Adoption at the Meeting in October, 1923.

OFFICERS ELECTED IN NORFOLK, OCTOBER, 1922.

President—Mrs. R. Lloyd Williams, 801 Stockley Gardens, Norfolk, Va.

First Vice-President—Mrs. J. Allison Hodges, 107 E. Franklin St., Richmond, Va.

Second Vice-President—Mrs. S. S. Gale, Roanoke, Va.

Third Vice-President—Mrs. Southgate Leigh, Norfolk, Va.

Fourth Vice-President—Mrs. W. E. Anderson, Farmville, Va.

Recording Secretary—Mrs. Burnley Lankford, Norfolk, Va.

Treasurer—Mrs. Starke Sutton, Norfolk, Va.

CONSTITUTION

ARTICLE I—Name

The name of this Association shall be the Woman's Auxiliary to the Medical Society of Virginia.

ARTICLE II—Object

The object of this Auxiliary shall be to aid and encourage the medical profession in its efforts to educate the public in matters of sanitation and health; to assist in entertainment at State, district

and country society meetings; to promote acquaintanceship among doctors' families, that local unity and harmony may be increased.

ARTICLE III—Membership

The membership of the Woman's Auxiliary of the Medical Society of Virginia shall be composed of the County Women's Auxiliaries to the County Medical Societies. The wives and daughters of all doctors shall be eligible for membership.

ARTICLE IV—Officers

The officers of this Auxiliary shall be a President, four Vice-Presidents, a Recording Secretary, a Corresponding Secretary and a Treasurer.

ARTICLE V—Executive Board

These officers, together with one representative from each of the ten Councilor's Districts of the State Medical Association, shall constitute an Executive Board to conduct the business of this Auxiliary.

ARTICLE VI—Elections

(a) These officers and the ten district representatives constituting the Executive Board shall be elected by ballot at the general meeting for a term of two years.

(b) A nominating committee shall be appointed by the Executive Board to present a list of officers and representatives for election; this committee to be composed of five members, not more than three of whom may be members of the Executive Board.

ARTICLE VII—Meetings

The meetings of the Woman's Auxiliary shall be held at the same time and place as the Medical Society of Virginia.

ARTICLE VIII—Delegates

Each County Auxiliary shall be entitled to one delegate for each twenty-five members or less, and for each additional twenty-five members, one additional delegate, these accredited delegates with the members of the Executive Board to form the voting body.

ARTICLE IX—Dues

Each County Auxiliary shall pay dues to the State Auxiliary at the rate of ten cents per capita, at least one month prior to the annual meeting. Each County Auxiliary shall decide the amount of their local dues.

ARTICLE X—Amendments

This constitution may be amended at any regular meeting of the State Auxiliary, provided written notice has been sent each County Auxiliary not less than one month prior to said meeting.

BY-LAWS

1. **DUTIES OF OFFICERS.** The duties of the President, Vice-Presidents, Recording and Corresponding Secretaries and Treasurer shall be those which usually devolve upon such officers.

2. **COMMITTEES.** The President and Executive Board shall have power to create such committees as become necessary to promote the work of the Auxiliary.

3. **MEETING.** All meetings of the Auxiliary and the Executive Board shall be conducted according to the regular order of business and Robert's parliamentary laws.

4. **QUORUM.** Seven members of the Executive Board shall constitute a quorum.

5. **AMENDMENTS.** These by-laws may be amended at any meeting of the Executive Board or at the annual meeting of the Auxiliary by a two-thirds vote of the members present, not less than fifteen, provided such amendments must not conflict with the spirit of the constitution.

The Dinwiddie County Medical Society,

At a recent meeting, unanimously elected

Dr. George H. Reese, Petersburg, president; Dr. E. W. Young, Petersburg, vice-president; and re-elected Dr. W. C. Powell, Petersburg, secretary-treasurer, for the ensuing year.

Dr. Fletcher J. Wright, Petersburg, was chosen as delegate to the annual meeting of the Medical Society of Virginia in Roanoke.

The Southside Virginia Medical Association

Met in Petersburg, March the 13th, Dr. W. C. Harman, first vice-president, of Dolphin, presiding. A large number of excellent papers were read and discussed. Between the afternoon and evening sessions, the members were entertained by the Petersburg Faculty at a course dinner at Petersburg Hotel.

The next meeting will be held in Lawrenceville on the second Tuesday in June.

R. L. RAIFORD, *Sec'y.*

Correspondence.

Bonds for Roads.

As all doctors as well as other citizens of Virginia are interested in voting for the quickest and surest way of securing good roads for our State, we are publishing a note which was received at this office as it may have weight in making our readers get solidly behind the movement for good roads when the question comes to the vote.

WARRENTON, VA.

March 24, 1923.

TO THE EDITOR:

Let us have bonds for roads. Why? Because the bond-issuing states are the only ones which now have and enjoy good roads. That is convincing argument that bonds "do the trick." Women, especially, should vote solidly for bonds as they need good roads for recreation and as a health measure for themselves and their children.

Doctors! vote for bonds for good roads, the plan adopted by other states which have secured good roads.

STEPHEN HARNSBERGER, M. D.

Analyses, Selections, Etc.

Bismuth in the Treatment of Syphilis.

Clemens Simon and J. Bralez (Bull. Med. 1922, 36:523) reviews the recent literature regarding the treatment of experimental and human syphilis with various salts of bismuth,

the most important of which is sodium and potassium tartro-bismuthate. The first Congress of Dermatology and Syphilis which just took place at Paris devoted a whole session to reports of investigations with these drugs. The authors report their own experience in the treatment of 113 cases of syphilis with insoluble bismuth salts. They employed four different preparations of sodium and potassium tartrobismuthate. The route of the administration was intramuscular, the drug being given in oily suspension. The dosage was 20 cg. each injection being given twice a week, a course of treatment consisting of from 6 to 12 injections.

The authors find that the reactions from the use of this drug are in general those described by previous investigators. The most important reaction is stomatitis which occurred in about 12 per cent of all cases treated. In a somewhat higher proportion of cases, however, there appears also a bluish line on the borders of the teeth and large bluish spots on the internal surface of the cheeks, this pigmentation being similar to that observed in chronic lead poisoning. In practically all instances the stomatitis was mild and cleared up promptly on the cessation of bismuth treatment. An additional 12 per cent of patients developed reactions of other types during the course of treatment, these reactions being for the most part, cramps, malaise, nausea, headache, and a single reaction simulating nitroid crisis after arsphenamine. In general, reactions of all types are mild and did not interfere to any great extent with the treatment.

So far as the therapeutic results are concerned, treponema disappeared within 2 to 14 days from chancres and from the mucous lesions of secondary syphilis. Chancres were healed in the average of 14 days after a total of 4 injections, whereas the lesions of secondary syphilis healed in an average of 22 days after 6 injections. A number of cases of latent Wassermann positive syphilis were treated, but the authors conclude that too little time has elapsed to permit any evaluation of the serologic results. Their impression is that bismuth acts less rapidly than arsphenamine on the Wassermann reaction. They treated 3 cases of cerebro-syphilis and 7 of tabes dorsalis. In several of these there was notable improvement of clinical symptoms, but no change occurred in the cerebrospinal findings. They conclude that the salts

of bismuth may prove to be of great value in the treatment of syphilis, particularly in those cases unfortunately too common, which are intolerant of arsphenamine and mercury. (Progress of Medical Science, *American Journal of the Medical Sciences*, November, 1922.)

The Truth About Medicine

During February, the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

Eli Lilly and Co.,

Schick Test and Schick Test Control. Eli Lilly & Co.

Diphtheria Toxin-Antitoxin. Eli Lilly & Co.

H. K. Mulford Co.,

Pneumococcus Antibody Solution, Types I, II and III Combined. Mulford.

Parke, Davis & Co.,

Diphtheria Toxin and Control for the Schick Test. P. D. & Co.

Neo-Silvol.

Mercurosal

Tincture No. 111 Digitalis. P. D. & Co.

NEW AND NON-OFFICIAL REMEDIES.

Bacillus Acidophilus Milk—Lederle.—Whole milk cultured with *Bacillus acidophilus*. It contains not less than fifty million of viable organisms. (*B. acidophilus*) per Cc. During recent years reports have been published which indicate that the growth in the intestinal canal of the normally present *Bacillus acidophilus* may be increased so as to make it the predominating organism, by the administration of milk inoculated with *B. acidophilus*, by the administration of viable cultures of *B. acidophilus* in conjunction with lactose (sugar of milk), or by administration of lactose alone. The therapeutic value of cultures of *B. acidophilus* is still in the experimental stage. For a discussion of the actions and uses of lactic acid ferment preparations, see New and Non-official Remedies, 1922, p. 156. **Bacillus acidophilus milk—Lederle** must be kept on ice and should be used within one week of the expiration date which appears on each package. Lederle Antitoxin Laboratories, New York. (Jour. A. M. A., February 3, 1922, p. 323).

Theocin Sodium Acetate.—A brand of theophylline sodio-acetate—N. N. R. (See New and Non-official Remedies, 1922, p. 357). Winthrop Chemical Co., New York. (Jour. A. M. A., February 10, 1923, p. 401).

Diphtheria Toxin and Control for Schick Test—P. D. & Co. Diphtheria Immunity Test (New and Non-official Remedies, 1922, p. 320), marketed in packages containing one vial of 0.1 Cc. of undiluted, standardized diphtheria toxin, one vial of 5 Cc. of sterile physiologic solution of sodium chloride, one vial of 5 Cc. of diluted control of Schick test and one sterile syringe point. Each package contains material sufficient for fifty doses. Parke, Davis & Co., Detroit, Mich. (Jour. A. M. A., February 17, 1923, p. 475).

Diphtheria Toxin—Antitoxin Mixture—Lilly.—A diphtheria toxin-antitoxin mixture (see New and Non-official Remedies, 1922, p. 282), each Cc. constituting a single human dose and containing 3 L+ doses prepared in accordance with the requirements of the U. S. Public Health Service. Marketed in

packages of three vials sufficient for one treatment. Eli Lilly & Co., Indianapolis, Ind.

Schick Test—Lilly. A diphtheria immunity test. (See New and Non-official Remedies, 1922, p. 320). Marketed in packages containing one vial of diphtheria toxin sufficient for ten tests and a vial of sterile physiological solution of sodium chloride and in packages of ten vials containing toxin sufficient for one hundred tests accompanied by ten vials of sterile physiological solution of sodium chloride. As a control, the Schick test control, representing diphtheria toxin of the same lot treated to destroy the specific exotoxins is supplied. Eli Lilly & Co., Indianapolis, Ind. (Jour. A. M. A., February 25, 1922, p. 553).

PROPAGANDA FOR REFORM.

More Misbranded Nostrums.—The following products have been the subject of prosecution by the federal authorities charged with the enforcement of the Food and Drugs Act:

Healing Springs Water (Virginia Hot Springs Co.), a moderately mineralized water, containing bicarbonates of calcium and magnesium, and magnesium sulphate (Epsom salt); **Brick's Sarsaparilla** (Palestine Drug Co.), containing small amounts of sodium salicylate, potassium iodid, plant drug extractives, including sarsaparilla and a laxative drug, sugar, alcohol and water; **Yerk's Wine Extract of Cod Liver Oil** (Yerk's Chemical Co.), consisting essentially of compounds of sodium, potassium, calcium, iron, quinine, strychnin and phosphorus, extracts of plant drugs, possible traces of cod-liver oil, malt extract, sugar, alcohol and benzaldehyde as a flavoring; **Anemia Tablets** (Carlos M. Rivoll), containing 95 per cent. of milk sugar and small quantities of cinchona alkaloids, charcoal, sulphur, gum and compounds of arsenic, phosphorus, iron and sodium. (Jour. A. M. A., February 3, 1923, p. 343).

A Patented Consumption Cure.—The U. S. Patent Office has issued patents for many preparations to be used in medicine for which there has not been the slightest scientific justification. The most recent and most flagrant lack of intelligent patent law administration is to be found in a patent issued to Sergluson and exploited by the Savrite Medical Manufacturing Co., Los Angeles, Calif., for an alleged cure for tuberculosis.

This is the patented cure: Pure olive oil 1 gallon, squill root 3 pounds, bitter almonds 1¼ pounds, nettle (the plant except the root) 1½ pounds, red poppy flower petals 1 pound. These various ingredients are to be mixed, put in a closed container, gradually warmed and left standing for about 72 hours, when the mixture is squeezed, mixed and filtered. The filtrate comprises the "cure." (Jour. A. M. A., February 10, 1923, p. 420).

Brown's New Consumption Remedy.—The Post-office Department has issued a fraud order against B. H. Brown, M. D., of Jacksonville and St. Augustine, Fla., and Brown's Magnolia Remedy Co. For some time Dr. Brown, a negro, has been advertising Dr. Brown's New Consumption Remedy, especially to members of his own race, who are afflicted with tuberculosis. In 1917 the federal authorities prosecuted Brown under the Food and Drugs Act, holding that the claims for the preparation were false and fraudulent. Though convicted, he continued making his claims in newspaper advertisements, and in circulars that answered these advertisements. While the Department of Agriculture is helpless to prevent this form of fraud under the provisions of the Food and Drugs Act, the Post Office authorities are able to reach this form of fraud. The Department filed charges against Brown and after hearing the defense issued a fraud order against Magnolia Remedy

Co. and E. H. Brown. (Jour. A. M. A., February 17, 1923, p. 495).

Allen's Goiter Treatment.—At Sheffield, Iowa, the Allen Remedy Co. conducts a mail order business in "Dr. C. J. Allen's Goiter Treatment." The A. M. A. Chemical Laboratory analyzed the Allen nostrum and found it to consist essentially of ferrous iodide and hydrogen iodide (hydriodic acid), in a colored and flavored syrup. The serious side of the Allen Goiter Remedy Co. business is the indiscriminate sale of the nostrum to those who may be, and are likely to be suffering from exophthalmic goiter. It is well known that the use of iodine is likely to aggravate this disease and hence it is not surprising that physicians are beginning to report serious results from the use of the Allen preparation. (Jour. A. M. A., February 24, 1923, p. 572).

Book Announcements

Clinical Medicine. I. Tuesday Clinics at Johns Hopkins Hospital. By LEWELLYS F. BARKER, M. D., LL.D., Professor of Medicine, Emeritus; Visiting Physician to Johns Hopkins Hospital, Baltimore. Illustrated. Philadelphia and London. W. B. Saunders Company. 1922. Cloth. Price \$7.00

This volume of modest size consists of thirty-one of Dr. Barker's clinical lectures. The cases presented are such as are often met in general practice but not always correctly diagnosed. In the opening chapter in which he discusses *his* method of arriving at a diagnosis, Dr. Barker decries that not very ancient practice of jumping at a diagnosis based on a single symptom, generally that most complained of by the patient, such as "headache," "cough," "lumbago," etc.

He emphasizes that the first step in arriving at a correct diagnosis is the *feeling of a diagnostic difficulty*. It is safe to say that some doctors *rarely* experience this "feeling" and the chiropractors *never*.

Representative of the highest ideals in modern clinical teaching this book is worth not only a careful reading but study. H.

The Riddle of the Rhine. By VICTOR LEFEBURE, Officer of the Order of the British Empire (Mil.), Chevalier de la Legion d'Honneur, Officer of the Crown of Italy, Fellow of the Chemical Society, etc. With a Preface by MARSHAL FOCH, and an introduction by FIELD-MARSHAL SIR HENRY WILSON, BART., Chief of the Imperial General Staff, New York. E. P. Dutton and Company, 681 Fifth Avenue. 8vo. Cloth. 282 pages.

This book deals with chemical warfare and the scientific and economic conditions that underlie it. The author was on the firing line with the British from the time the Germans threw over the first poison gas, and his work is considered authoritative by Marshal Foch, Field-Marshal Wilson and other leaders of

the allies in the field, as well as by Lord Moulton and other chemical authorities. It is an account of the critical struggle for power and for the decisive war initiative.

Textbook of Anatomy and Physiology. For Training Schools and Other Educational Institutions. By ELIZABETH R. BUNDY, M. D., Formerly Adjunct Professor of Anatomy, Woman's Medical College of Pennsylvania. Fifth Edition Revised and Enlarged by MARTHA TRACY, M. D., Dr. P. H., Professor of Nutritional Hygiene, Woman's Medical College of Pennsylvania, and GRACE WATSON, R. N., Educational Directress, Philadelphia General Hospital Training School for Nurses. Philadelphia. P. Blakiston's Son & Co., 1012 Walnut Street. Cloth. 1923. 442 pages, including a Glossary and 266 illustrations, 46 of which are printed in colors. Price, \$2.50.

The fact that this is the fifth edition of this book and that it has been revised and enlarged attests its popularity.

All revisions have been made with a view to giving the reader the benefit of the latest results in research and experimental work.

To Establish Mental Hygiene Clinic.

The Board of Mental Hygiene of Maryland plan the establishment of a mental hygiene clinic in Baltimore, where physicians from the state institutions will be in attendance and will endeavor to come into contact with patients with mental disorders in the incipient stage. This should mean a reduction in the number of admissions to the state hospitals for insane. This clinic will be conducted in connection with the medical work of the University of Maryland.

Contract Placed for Virginia Baptist Hospital.

Trustees of the Virginia Baptist Hospital, to be located at Lynchburg, placed the contract for construction of the central plant of the institution, the middle of February. Work will be started as soon as practicable and will be completed, according to specifications, in eight months. It is understood that the cost of this building is to be about \$200,000.

Veterans' Hospital Near Battle Creek.

One of the veterans' hospitals for which Congress made appropriation is to be built west of Battle Creek, Mich., where Camp Custer sprang into a great cantonment. This hospital will have thirty buildings, which will spread over 500 acres of land, and will be for former service men suffering from nervous and mental disturbances. It is stated that the buildings will cost a million and a half dollars.

Virginia Medical Monthly

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No. 1

Editorial

Diagnosis by the General Practitioner.

Far-sighted and candid minds in medicine are confessing openly, at least within medical circles, that the modern practice of the medical art has fallen in some evil ways. These evil ways have come as a result of the specialism of medicine. These evil ways of practice have come along with great benefits, however; the benefits have been untold in advancing the knowledge of medicine and in adding to the skill and perfection of the art. But, in connection and as a result of these benefits, have come evils which now must be squarely faced; not only must we recognize these deterrents to practice, but we must take steps to eliminate them while retaining all the good possible.

There are always in every stage of professional progress and in every advance of scientific knowledge a proper and healthful reaction from the extreme position. This is seen, on the one hand, in the widespread movement in medical practice to specialize; to divide and sub-divide into specialists, until the sick or diseased body must be subjected to the inquiry and study of groups composed of more or less multiple specialists. From such a condition, on the other hand, conservative medical men are dissenting. From such an extreme and useless complexity of practice, the public, itself, may soon assert a vigorous protest.

But the demands of modern medicine must be met. The reaction from the large number

of specialists must be met by a movement for the wider and greater improvement in the work of the general practitioner. The general practitioner must avail himself of newer opportunities for a "look-in" on the simpler methods of investigation used by the specialists. The general practitioner must be equipped with a broader knowledge of the more elementary facts and methods of specialism. If changes can be brought about whereby the family doctor may be shown and taught a wider knowledge of the more essential things of the special fields of medicine and the specialists themselves be re-taught from time to time, the more fundamentals of general medicine, the conditions which appear to deter the progress of medicine today will be largely corrected and the public usefulness of the profession will be greatly enhanced.

With just one phase of this very large subject the title of this editorial has to deal. Every practitioner, for instance, should possess and use a head mirror. A large number of the patients who pass before the bar of judgment of the general practitioner never receive the benefits which would come to them from a careful reflection of light in the mouth and throat from a head mirror. The mouth, nose and throat, after all is said, are very vulnerable. There enter and here are harbored the foci of much disease, oftentimes in its very incipency, sometimes in its late manifestation.

Diagnosis is the most important procedure in medicine. Amid the multiplicity of laboratory and instrumental methods of examination, one may overlook the most essential methods of examination. No one possessing a true appreciation of the advantages of accurate scientific methods of investigation of disease would utter a word derogatory to this great field of modern medicine but would, on the contrary, proclaim highest appreciation of these advances of modern medicine. But the general practitioner or family physician can only hope to make use of these more or less technical methods in a limited number of or in obscure cases. In the large number of cases coming under his observation, the use of the simpler methods of investigation, such as the use of the head mirror or even the "flash-light" may disclose often some important point in the diagnosis or etiologic phases of cases. Some recent writer has said that eighty per cent. of the usual routine cases coming

under observation of the general practitioner may be diagnosed without resort to the more extensive laboratory and special investigation.

The resourceful and thoughtful practitioner may simplify the problem of diagnosis by the use of a carefully taken personal history of the case, plying careful inquiry into the previous events and into the circumstances of the illness under judgment; by the diligent and precise use of the special senses, observing, inspecting, hearing, smelling, feeling the presenting signs and symptoms; by the use of the thermometer, the watch, the head mirror, the tongue depressor, the stethoscope, he may bring out the leading points in the case. A careful and accurate physical examination, with the patient prepared to submit to a methodical examination unobstructed by clothing, is an important point in the back-to-common-sense-method of medical diagnosis. Inspection, palpation, percussion and auscultation of the diseased body will bring to light much and telling information, if methodically and carefully conducted.

Let every practitioner make of his daily routine of practice a clinic for himself. Let him quicken his powers of perception by the careful study of the clinic passing through his hands daily. This he can do by the earnest effort in perfecting himself in a systematic and methodical examination of the head, the neck, the thorax, the abdomen, the genitalia, the extremities, the examination of the systems or the organs, et cetera; any method that covers the body may be adopted; and such observations as are made should be recorded. The written record of one's findings serves a double end: (1) as a record; (2) as educational and instructive in its making to the practitioner.

Special examinations are demanded in a part of one's cases. Those cases which do not yield to the usual careful investigation of average examinations may need further study in the pathological laboratory of the blood, urine, the sputum, secretions, excretions. These may need careful study by special men and methods. The careful examination of urine, blood, sputum, feces, stomach contents, may be easily conducted by the general practitioner after a little study. The more difficult examinations in the hands of specialists must be used in obscure cases. The X-ray, the blood culture, bacteria studies, serology, blood chemistry and the multitude of highly specialized inves-

tigations of the specialists have a place in cases not diagnosed by the easier methods.

As pointed out by Billings*, cases of chronic nephritis, heart diseases, diseases of the lungs, diseases of the stomach, anemia, appendicitis, cholecystitis and acute diseases, in the usual and ordinary types, the general practitioner may rather readily diagnose without resort to the ultra-scientific methods of modern medicine.

International Clinics, for March, 1923, has the following comment to make on the question of "The Rational Attitude Towards the X-rays in Diagnosing Digestive Diseases":

"The recent death of Roentgen should not make us oblivious to the fact that his epoch-making discovery has been distinctly a two-edged sword in the digestive field. Dr. Thomas R. Brown, of Baltimore, believes that in the case of a great many physicians, the X-rays have consciously or unconsciously persuaded them to be much less thorough in their careful analysis of the case and in their clinical studies, and this, we feel, is very deplorable, because from X-ray studies alone diagnosis should not, and in many cases cannot, be made. It is to Dr. Brown peculiarly distressing to see a diagnosis founded on very careful clinical study of the case overthrown by a few words from a radiologist, who often is untrained clinically and only too frequently has not had a broad experience in reading X-ray plates. While it is obviously easy to fluoroscope a patient and to take X-ray plates, nothing is more difficult than to explain the pictures on the screen, or to interpret the abnormalities of form or position as manifested in the plates. 'I would rather,' said recently a celebrated Italian internist, 'have no X-ray examination in a case than X-ray plates interpreted by anyone other than a master in this field.' To regard the X-ray as the court of last resort in diagnosis is fundamentally wrong except in gross conditions which can, in the majority of cases, be diagnosed just as definitely by other means. Except in such cases the X-ray diagnosis can rarely be definite—should only suggest various possibilities the probability of which must be dependent upon other features of the case, as determined by careful history taking, a thorough clinical examination, and the use of various special tests. The X-ray is but one of many means of reaching a diagnosis, none of

*J. A. M. A., February 24, 1923.

which except in occasional instances is capable of furnishing the diagnosis *per se*, but each of which should be used in proper proportion in reaching a probable or, in rare instances, an absolute diagnosis. To show the difficulty even in the hands of experts, Dr. Brown suggests the advisability of having the same case studied under exactly the same conditions by various radiologists. In certain cases all will agree on the diagnosis. These, as a rule, are the easy cases, diagnosable by other means; but in a considerable proportion of cases very different diagnoses will be furnished by different men, all honest, all experienced, all capable in this field. The pictures are definite, the images on the screen are definite, but the interpretation always is a question of subjectivity, and must differ unless the picture is perfectly obvious."

Mongolian Idiocy or Thymus Deficiency.

If cretinism is a disease of fetal or infantile life, brought about by the deficiency of the thyroid or its absence, resulting in failure of the body and mind to evolve into normal physical and mental proportions, may we not think of the possibility of a decreased or absent thymus gland in early life, producing such a condition in the physical and mental side of infants and the young as we know of as mongoloids?

The physiognomy of the mongolian is rather typical. The head is often flattened. The hair is straight, thin, fine and there is tendency to baldness at the parts in the hair. The skin is pale and dry. The nails are fragile. The nose is snubbed, small and flat; the ear lobes crimped and distorted. The mouth is usually open; the lips thin. Mouth breathing expression is common. The body is dwarfed. The chest is small, the abdomen prominent and balloned. The long bones are thin. The hands are stubby and the feet are small and the mentality is retarded. Signs of feeble-mindedness appear early. There is mental apathy; the good natured, quiet, satisfied mental attributes may be quite indicative of the mongoloid. As they grow older, they accentuate the faculty of possessing "a secret joy," by displaying an active, happy, bright, smiling, aggressive, familiar amiableness. There is, often, no restraint by timidity or bashfulness; on the contrary, the mongoloid makes acquaintances with the aggressiveness of the politician seeking office.

It is thought that mongoloids appear in parents of advanced age, when the mother parent is approaching the end of gestation, and in the case of twin birth.

Myxedema or Gull's Disease.

This is a constitutional disease seen in the adult, which results from a decrease or absence of the thyroid secretion (thyroxin). It is characterized by decreased metabolic rate, by marked changes in the skin, by impaired mental development associated with a typical facial expression.

The causes are not altogether known. Atrophy of the thyroid appears to be the cause, although it is not known what are the etiologic factors always at the bottom of such atrophy. Thyroiditis at some time is accepted as the most common causative factor. Plummer's suggestion is that the thyroiditis may be set up by an infection entering through "the hyperplastic lymphoid tissue of the nasopharynx." Heredity has been also considered as a cause of the atrophic thyroid. The pathological changes are characterized by a small gland, showing microscopically a "marked increase in fibroid connective tissue with a decrease in the vesicles;" possibly round cell infiltration is found in walls of the vesicles.

Myxedema is more frequent in women than men, at a ratio of five to one.

The disease is characterized by rather slow but definite changes throughout the body, and the onset is gradual and, at first, quite subtle: (1) lassitude; (2) lack of energy; (3) general slowing down; (4) increase of weight; (5) decrease of appetite; (6) non-pitting edema; (7) skin thickened and scaly, particularly, hands, arms and legs; (8) nails striated and brittle; (9) decrease in perspiration or absence of it; (10) dryness of hair, fine and thin; (11) eye lashes and eye brows thin out; (12) facial features broaden, lips thicken, nose flattens; (13) subcutaneous tissue of the entire body becomes infiltrated with non-pitting edema; (14) speech slows and thickens; (15) vision and hearing, sense of smell and mental alertness decrease in acuity; (16) forgetfulness, imperfect cerebration; (17) calm, placidity; indifference; drowsiness falls like a pall over the mental self.

Diagnosis of these cases should be made early. No doubt, early cases of myxedema are escaping diagnosis. The obesity of the

female as she passes into her climacteric cycle may obscure the presence of the myxedematous patient. Fat in the female who has passed the menstrual period should be studied for hypothyroidism and early symptoms of the marked alteration in physical features and functions of the body.

The basal metabolism rate should be studied; thyroxin influence on the metabolic rate is a useful method of determining the diagnosis, along with careful history and physical examination.

The General Assembly of 1924 and Good Roads!

The decks are cleared at last and the ship of state may now be manned for a battle royal in the cause of good roads. This is the hour for the doctors of Virginia to go into politics. No friend of the physicians of the State would want to urge doctors to go into politics in the ordinary acceptance of that term. Nothing could happen to do greater harm to the profession than to have a large number of the physicians of Virginia go into politics for selfish ends or for political honors. On the other hand, in this big patriotic call that is given to doctors to become interested personally in the next General Assembly of Virginia, one can have no other reason than that it is a call to duty: not for selfish ends, but for the advancement of the welfare and interests of the people of Virginia.

It is needless to go into details. Every one knows that the next election of the members of the Senate and House of Delegates is the most important in the present generation from the standpoint of material and cultural development and progress.

The doctors of the State are urged to enter actively into the campaign of election of candidates. If possible, let doctors "run" themselves. The sacrifice will be great but the reward will be adequate, if a new and progressive step is taken in Virginia for the purpose of pulling Virginia out of the mud.

It is not too early to begin to think and work on this matter. The following groups of counties compose the Senate districts: (1) Washington, Smith and city of Bristol; (2) Scott, Lee and Wise; (3) Buchanan, Dickenson, Russell and Tazewell; (4) Roanoke County, Montgomery and the cities of Roanoke and Radford; (5) Giles, Bland, Pulaski and Wythe; (6) Carroll, Grayson and Pat-

rick; (7) Craig, Botetourt, Alleghany, Bath and city of Clifton Forge; (8) Rockingham; (9) Augusta, Highland and city of Staunton; (10) Shenandoah, Frederick and city of Winchester; (11) Fauquier and Loudoun; (12) Clarke, Page and Warren; (13) Spotsylvania, Stafford, Louisa and city of Fredericksburg; (14) Arlington, Prince William, Fairfax, and city of Alexandria; (15) Culpeper, Madison, Rappahannock and Orange; (16) Goochland, Powhatan and Chesterfield; (17) Albemarle, Greene, and city of Charlottesville; (18) Appomattox, Buckingham, Fluvanna and Charlotte; (19) Amherst and Nelson; (20) Campbell and city of Lynchburg; (21) Halifax; (22) Bedford, Rockbridge, and city of Buena Vista; (23) Pittsylvania, Henry and city of Danville; (24) Pittsylvania and city of Danville; (25) Mecklenburg and Brunswick; (26) Franklin and Floyd; (27) Greenesville, Sussex, Surry and Prince George; (28) Nottoway, Amelia, Lunenburg, Price Edward and Cumberland; (29) Dinwiddie and city of Petersburg; (30) Isle of Wight, Southampton and Nansemond; (31) Norfolk city; (32) Caroline, Hanover, King William; (33) Norfolk County and city of Portsmouth; (34) King George, Richmond, Westmoreland, Lancaster, Northumberland; (35) Henrico, New Kent, Charles City, James City, and city of Williamsburg; (36) Elizabeth City, York, Warwick and city of Newport News; (38) Richmond City; (39) King and Queen, Middlesex, Essex, Gloucester, Mathews.

What an array of historic names! What do they not stand for in English and Colonial American history!

What of the future, doctors of Virginia?

News Notes

Our Semi-Centennial Volume

Begins with this issue and it may not be amiss to say something of our journal. With one exception, *The New Orleans Medical and Surgical Journal*—the VIRGINIA MEDICAL MONTHLY is the oldest medical journal published in the Southern states. It was established in 1874 by the late Dr. Landon B. Edwards, has been published continuously since and, until its complete adoption, was known as the non-official organ of the Medical Society of Virginia. For twenty-two years it appeared as a monthly, for twenty-

two years (lacking three months) as a semi-monthly after which it resumed monthly publication. During the meeting of the American Medical Association in Richmond, in 1881, a daily edition of the journal was published that the Association news might promptly reach those interested.

Upon the death of the founder of the journal, its management and editorship was assumed in December, 1910 by the Associate Editor, Dr. Charles M. Edwards, who associated with him a staff of editors. Beginning January, 1918, the journal was changed back to a monthly publication. It remained under this management through October, 1919, at which time it was purchased by the Medical Society of Virginia as their official organ. Since then it has been under the charge of the Publication Committee of the Medical Society of Virginia, with Dr. Alexander G. Brown, Jr., as editor.

In accordance with the needs of the times, this journal has always aimed to maintain a high standard and it is our purpose now to make and keep it at least the equal of any State medical journal. To this end, we want your co-operation in every way. One of these is to patronize our advertisers. A large part of the revenue for running the journal has to be obtained from its advertising pages. All of our advertisements are acceptable to the Council on Pharmacy and Chemistry of the American Medical Association, the highest standard set.

Won't you look over our advertising pages regularly and write to and patronize our advertisers that they may know you are interested? Tell them where you saw their advertisement. This will help us all. If we personally appreciate interest manifested in us and our work, why should not our advertisers?

The Southwestern Virginia Medical Society

Will hold its next meeting in Christiansburg, May 17th and 18th. Dr. R. H. Woollong, Pulaski, presiding. Dr. E. G. Gill, Roanoke, is secretary of the Society, and Dr. A. M. Showalter, Cambria, is chairman of the local committee of arrangements for this meeting. The preliminary program shows a number of interesting papers on a variety of subjects. There will be a symposium on "Cancer," which will be discussed as follows: Etiology and Pathology, by Dr. K. D. Graves, Roanoke. Symptomatology and Diagnosis, by Dr. W. H.

Ribble, Wytheville; Surgical Complications, by Dr. T. Allen Kirk, Roanoke; Treatment (X-ray), by Dr. B. E. Rhudy, Abingdon. The discussion on these papers is to be opened by Dr. J. Coleman Motley, of Abingdon.

A subscription banquet is to be held on the evening of the 17th of May at the Courthouse.

The Walter Reed Medical Society

Will hold its next meeting at the National Soldiers' Home, Hampton, Va., Wednesday and Thursday, May 2nd and 3rd. This meeting promises to outstrip all former meetings in interest and it is expected to be the largest from the standpoint of attendance in the history of the organization. Among the visitors who will read papers are Drs. B. B. Vincent Lyon, Philadelphia; Walter E. Dandy, Baltimore; W. B. MacNider, Chapel Hill, N. C.; H. A. Royster, Raleigh, N. C.; W. L. Peple and Murat Willis, Richmond; J. E. Diehl and L. T. Royster, Norfolk. In addition to these, interesting papers will be presented also by members. Interesting clinics will be conducted by Dr. C. P. Jones, of Newport News, and Dr. J. J. Cullinan, of the staff of the Soldiers' Home.

Further information may be obtained from the secretary, Dr. L. E. Stubbs, Newport News. The president is Dr. Rea Parker, Smithfield, Va.

The San Francisco Meeting.

For the convenience of those who expect to attend the meeting of the American Medical Association in San Francisco, June 25 to 29, it is announced that, effective May 15 and daily thereafter until September 30, western railways will place on sale round trip tickets to San Francisco, with a return limit of October 31. These tickets will permit stopovers at any point on the going or return trip. Many social, sight-seeing trips and tours are being arranged by the California committee to suit the convenience of visiting Fellows and their friends.

From a scientific standpoint, in addition to the excellent papers which will be presented in the many sections on June 25 and 26 a series of nearly one hundred diagnostic clinics will be held and, on July 2 and 3, post-convention diagnostic clinics will be held in many places in the State.

All scientific meetings, exhibits, the House of Delegates, and, in fact, all important ac-

tivities, will be held in one building, the Civic Auditorium, which is close to the commercial and hotel section of the city.

Requests for service of any kind should be addressed to Dr. W. E. Musgrave, Chairman California Committee, Convention Headquarters, 806-809 Balboa Building, San Francisco, Cal.

The Woman's Auxiliary to the Medical Society of Virginia.

Is anxious to get actively to work and the Constitution and By-Laws of the Auxiliary, as tentatively submitted for adoption at the Roanoke meeting, appear under the Proceedings of Societies in this issue. As the wives and daughters of all members of the Society are eligible to membership in the Auxiliary, it is hoped they will familiarize themselves with the work of this Association and take an active interest in its proceedings. Mrs. J. Allison Hodges, Richmond, was organization chairman and was appointed a delegate from Virginia to the Woman's Auxiliary of the A. M. A. meeting in San Francisco in June.

At the Norfolk meeting, Mrs. R. Lloyd Williams, Norfolk, was elected president; and Mrs. J. Allison Hodges, Richmond, Mrs. S. S. Gale, Roanoke, Mrs. Southgate Leigh, Norfolk, and Mrs. Wm. E. Anderson, Farmville, vice-presidents; Mrs. Burnley Lankford, Norfolk, recording secretary, and Mrs. Starke Sutton, Norfolk, treasurer.

Roanoke doctors and their wives are planning for a large and interesting meeting. Begin making your plans now to be there.

Doctor's of Virginia—We Invite You.

The West Virginia Medical Association will hold its annual meeting in Beckley, West Virginia, June 12, 13, 14. The Raleigh County Medical Society is busy making elaborate preparations for the entertainment of our visitors. Beckley is a splendid mountain city of 8,000 population, altitude of 2,500 feet, delightful climate, and a wonderful place to spend your vacation. The various civic, business and professional organizations of Beckley are co-operating to the limit with the medical profession in putting over the *biggest* and *best* medical meeting ever held in West Virginia. The program is going to be an unusually good one. Visitors from many states have already made their hotel reservations. We promise to comfortably care for all who attend the meet-

ing. We will rejoice in your coming, and we shall hope for your days with us to be brim full of pleasure.

Doctors of Virginia—we extend you a most cordial and fraternal invitation to attend this meeting. Come—bring your wives, daughters, sons or sweethearts. Elaborate preparations have been made for the comfort and pleasure of the ladies. Arrangements are being made for a pullman-party from Richmond to Beckley. The pullmans may be utilized for living quarters, if so desired, while in Beckley. Definite announcement relative to this matter will be made in the May issue of the VIRGINIA MEDICAL MONTHLY. In the meantime, commence making your plans to be with us, because we are expecting you, and we promise you the best-three-days-time you have ever had.

RALEIGH COUNTY (W. VA.) MEDICAL SOCIETY.

The W. Va. Medical Association

Is to meet in Beckley from June the 12th to 14th inclusive. The invitation given above from the local medical society speaks for itself. It is so cordial that we hope many of our Virginia doctors will be able to make their plans to attend. West Virginia doctors are well known to the doctors of this State; a number of them also attended Virginia medical schools. Why not take this opportunity to renew old acquaintances and make new friends?

Married.

Dr. Thomas Neill Barnett and Miss Mary Gladys Reamy, both of Richmond, March the 28th.

Dr. William Neill, Jr., and Miss Alice Lawrence Buckler, both of Baltimore, April 7.

Dr. S. E. Weymouth,

Callao, Va., has resigned the presidency of the Callao State Bank.

U. S. Veterans' Hospital at Tuskegee.

The new U. S. Veterans' Bureau Hospital, for colored veterans, is shortly to be opened at Tuskegee, Ala. It is being erected on ground donated for the purpose by Tuskegee Normal and Industrial Institute. Its capacity is about 600 beds. It has been built for colored patients only, and is the best hospital of its kind in the world. It will be the policy to select colored eligibles for appointment when reached for certification in accordance with the civil service rules. Persons who are quali-

fied and who desire to enter the Government service at this hospital should immediately request full information and the appropriate application blank, addressing the U. S. Civil Service Commission, Washington, D. C., for positions as graduate nurses for chief, assistant chief, head and staff positions; reconstruction aides in occupational therapy and physiotherapy; reconstruction assistants in same; and dietitians, chief and staff positions.

Persons wishing to apply for the following positions should send for full information and application blanks, addressing The Secretary, Fifth U. S. Civil Service District, Atlanta, Ga.: physicians, general medicine, surgery and specialists; dentists; laboratorians in roentgenology, bacteriology and dentistry; and pharmacists.

The Inauguration of an Undergraduate Prize.

At the sixteenth regular meeting of The Richmond Pathological Society held Thursday, January 18, 1923, it was moved, seconded and carried that the Richmond Pathological Society appropriate \$25.00 for a prize to be offered for the best original research work produced by undergraduate students of the Medical College of Virginia during each current year, the idea being to encourage initiative among the students. The award is to be made under conditions prescribed by a committee consisting of the President of The Richmond Pathological Society, Chairman; Dr. Cook, Professor of Pathology; Dr. Noback, Professor of Anatomy, and the Secretary:

First, the prize will be awarded at commencement time.

Second, the applicant must be a bona fide undergraduate student of the Medical College of Virginia.

Third, the paper must be based on original observations and must be presented to the Secretary of the Richmond Pathological Society at least one month prior to commencement.

Fourth, the Richmond Pathological Society reserves the right to withdraw the prize for any particular year if no paper is presented which they consider worthy.

Dr. John Terrell Scott,

Of Cragmor Sanitarium, Colorado Springs, Col., and his wife have been on a visit to rela-

tives in Lynchburg. Dr. Scott is a grandson of the late Dr. John Terrell, of Campbell County, Va.

Dr. R. E. Booker

Has returned to his home in Lottsburg, Va., after a visit of several weeks in Florida.

Dr. Robert P. Kelly,

Lynchburg, Va., leaves the latter part of April for Chicago, where he has received an appointment as a regular house surgeon at Chicago Lying-In Hospital, effective May 8th to November 8th. This is the institution of which Dr. Joseph B. De Lee is the head, and Dr. Kelly is one of the few Southern doctors who has received an appointment there. On returning to Lynchburg about the middle of November, Dr. Kelly will limit his work to obstetrics as he has been doing for sometime.

The South Piedmont Medical Society

Will hold its regular meeting in Danville, April 17, under the presidency of Dr. George B. Barrow, of Clarksville. Dr. George A. Stover, South Boston, is president. The subject for general discussion is "Pneumonia." This will be discussed under the following subdivisions: Etiology and Symptoms, by Dr. J. A. Owen, Turbeville; Pathology and Diagnosis, by Dr. R. M. Taliaferro, Lynchburg; Treatment and Prognosis, by Dr. J. J. Neal, Danville; Surgical Phases, by Dr. H. Stuart MacLean, Richmond.

The meeting promises other good papers. The annual election of officers will be held at this time.

Fairfax County Health Work Continues.

The Fairfax County supervisors, at a recent meeting, decided to continue the health work in that county, and Dr. W. P. Caton, of Fairfax, was retained as local health officer.

Dr. Allen W. Freeman,

Formerly of this city, but now of the school of public health administration of Johns Hopkins University, was the principal speaker at the annual reunion and dinner of the Hopkins alumni in Richmond, March 16.

Hospital Staff, Salvation Army Home.

Dr. Robert C. Bryan has been appointed head of the staff of physicians who will be in charge of the Salvation Army Home and Hospital, in Highland Park, Richmond. Other physicians on the staff are Drs. Thomas W.

Murrell, Benjamin H. Gray, Paul Redd, and Clifton M. Miller.

Dr. and Mrs. Loren E. Cockell,

Reedville, Va., were recent visitors in Fredericksburg, having gone there to see their son who was taking Pasteur treatment after being bitten by a mad dog.

Dr. James K. Hall,

Richmond, has been appointed by Governor Trinkle as a member of the Board of Directors of Central State Hospital, Petersburg. The appointment is for a period of six years, beginning March 1, 1923.

Dr. W. W. Keen,

Emeritus professor of surgery at Jefferson Hospital, Philadelphia, who was invited to deliver the John McTyre Flowers Foundation lectures at Trinity College, Durham, N. C., this month, was unable, on account of sickness, to be on hand.

Dr. Dean B. Cole

Has returned to his home in Richmond after a short visit to New York and other northern cities.

Dr. Newton Still III.

As we go to press, we are advised that the condition of Dr. McGuire Newton, of this city, is slightly better, though he is still critically ill. Dr. Newton has been ill since November with inflammatory rheumatism, with heart complications.

Martin County (N. C.) Health Board.

Drs. V. A. Ward, Robersonville, and James E. Smithwick, Jamesville, have been appointed members of the Board of Health of Martin County, N. C.

Dr. William E. Warren, Williamston, N. C., was re-elected County Physician and Quarantine Officer.

The Medical Society of Virginia, Maryland and District of Columbia

Will hold its semi-annual meeting at Sandy Spring, Md., on May the 16th. Dr. William L. Lewis, Kensington, Md., is president, Dr. Wm. T. Davis, Washington, recording secretary, and Dr. Joseph D. Rogers, Washington, D. C., corresponding secretary.

The National Board of Medical Examiners

Makes the following announcement as to examinations for June and September: Part

I, June 25, 26, and 27, and Part II, June 28 and 29, 1923; also, Part I, September 24, 25, and 26, and Part II, September 27 and 28, 1923.

All applications for these examinations must be made on or before May 15th. Further information may be obtained from the Secretary, Dr. J. S. Rodman, 1310 Medical Arts Building, Philadelphia, Pa.

Dr. J. R. Adams,

Blackstone, Va., who was confined to his home for sometime by an attack of influenza, is able to be out again.

Dr. S. W. Maphis

Has returned to his home in Warrenton, Va., after a visit to Atlantic City, N. J.

Dr. William E. Brown,

Superintendent of Blue Ridge Sanatorium, Charlottesville, Va., and his wife recently visited Mrs. Brown's former home in Buckingham County, Va.

Dr. W. W. Chaffin,

Pulaski, Va., was a visitor in Richmond last month, having come here for treatment.

The Southern Public Health Laboratory Association

Had a most successful meeting in Richmond, March 23 and 24, from a scientific standpoint. A number of prominent speakers were heard and subjects of interest discussed. On the evening of the 23rd, Mr. Aubrey Straus, secretary, entertained the members and visitors at his home. Birmingham was selected for the next place of meeting and the following officers were elected: Chairman, T. F. Sellers, of the Georgia State Laboratory at Atlanta; vice-chairman, Aubrey H. Straus, of the Virginia State Laboratory, Richmond, and secretary-treasurer, Dr. Lynn C. Havens, of Montgomery, Ala.

Loudoun County Health Unit.

The Loudoun County (Va.) Health Unit has started active work, with Dr. P. M. Chichester, recently of Richmond, as director, W. G. Cline assistant director, and Miss Annie Gulley, nurse. Their services will be the same as those rendered by health units in other counties.

Dr. L. N. K. Bell,

Formerly of Waynesboro, Va., was a recent

visitor in Richmond, and gave a talk to the students at the Medical College of Virginia, under the auspices of the Y. M. C. A. Dr. Bell was a member of the class of '16, Medical College of Virginia, and in the October after graduating, went to China as a medical missionary from the Southern Presbyterian Church. He is now connected with the general hospital at Tsing Kiang Pu, China, and expects to return to China in August.

Major Henry C. Michie, M. C.,

Of the class of '07, University of Virginia, Medical School, has received the "French Medaille d'Honneur des Epidemies (argent)," according to a notice recently issued.

Dr. J. B. Woodson,

Lowesville, Va., it is announced, will offer himself this year for re-election as a member of the State Senate from his district.

Chiropractors Fined.

Two chiropractors in Norfolk, Va., were recently fined \$25 and costs on the charge of conducting a business in that city without proper city license.

The American Proctologic Society

Has issued the preliminary program for its twenty-fourth annual meeting to be held in Los Angeles, Cal., June 22 and 23, 1923, under the presidency of Dr. E. H. Terrell, of Richmond, Va. Dr. Ralph W. Jackson, Fall River, Mass., is secretary. Meetings will be held at Hotel Alexandria and the clinics at Los Angeles County Hospital.

Dr. Henry E. Davis,

Of this city, qualified April 2, before the City Clerk, as medical inspector to be attached to the Health Bureau of Richmond. He fills the vacancy caused by the resignation of Dr. P. M. Chichester.

"Sleeping Sickness."

According to reports made to the Division of Communicable Diseases of the New York State Department of Health, 308 cases of encephalitis lethargica developed in New York State during February of this year, which is more than in any other month in the last two years.

The U. S. Public Health Service states that it has no sufficiently reliable statistics in regard to the prevalence of "sleeping sickness," or encephalitis lethargica, to warrant a state-

ment as to the prevalence of the disease throughout the United States, as it is reportable in comparatively few states.

Dr. William Flegenheimer,

Of Guinea, Va., had a narrow escape from death recently, when his auto was stalled on the railroad tracks at a crossing near his home. Realizing his danger, Dr. Flegenheimer jumped just in time to save his life and was unhurt, but his roadster was entirely demolished.

Surgeons Return Home.

The last of March, the members of the American College of Surgeons, nearly two hundred in number, who had been touring South America, left Montevideo, Uruguay, for New York City. During their stay in South America, they visited a number of the principal hospitals and spent much time in sight-seeing.

Dr. Charles E. Conrad,

Harrisonburg, Va., has recovered from an attack of influenza.

Dr. A. C. Byers,

Harrisonburg, Va., was in Roanoke, Va., on business, the latter part of March.

Public Health Work of the A. R. C.

As some differences of opinion existed among members of the American Red Cross and members of the medical profession as to the peacetime health program of the American Red Cross, a Health Advisory Committee was appointed in October, 1922, to fully consider the subject. This committee was composed of Dr. William H. Welch, Baltimore, President of the Maryland State Board of Health; Dr. Hermann M. Biggs, New York City, Health Commissioner of the State of New York; Dr. Thomas S. Cullen, Baltimore, of Johns Hopkins University; Dr. Hugh S. Cumming, Surgeon General of the U. S. Public Health Service; Dr. Livingston Farrand, Ithaca, N. Y., President of Cornell University; Dr. Franklin H. Martin, Chicago, director of the American College of Surgeons; Dr. Fred B. Lund, Boston, Chief Surgeon at the Boston City Hospital; Dr. George M. Piersol, Philadelphia, editor of *American Journal of Medical Sciences*; Dr. John H. J. Upham, Columbus, O., member of the House of Delegates of the A. M. A.; and Prof. C. E. A. Winslow, New Haven, of Yale University Medical School.

After giving the subject most earnest and exhaustive consideration, the committee unanimously adopted a report which provides for the Red Cross a definite constructive program which every member and every chapter may follow with confidence. For the success of this program, a Director of Health Service is to be appointed, as soon as a suitable person can be selected, and the recommendations of the committee put into effect. It is stated that the national Red Cross should include in its permanent membership from 10 to 20 per cent. of the population of the country.

The American Laryngological Association

Will hold its forty-fifth annual congress at Hotel Ambassador, Atlantic City, N. J., May 16-18, under the presidency of Dr. Emil Mayer, of New York City. Dr. George M. Coates, of Philadelphia, is secretary.

Normal School to Give Degree Course in Physical Education.

The Fredericksburg, Va., State Normal School for Women has been designated by the Virginia Normal School Board to offer a four year B. S. degree course in Physical Education. This will commence next session. A new concrete open air theatre has been constructed and a standard athletic field is to be constructed during this summer, to be used for outdoor athletic activities. The faculty will be increased to take care of this new degree course.

Dr. Frank W. Lewis,

Of Morattico, Va., recently underwent an operation at Johns Hopkins and is reported improved.

Communicable Diseases and Travel.

Uniform provisions governing the travel of persons suffering from contagious diseases are now in force over a large part of the United States, according to a bulletin just issued by the U. S. Public Health Service. Twenty states (Alabama, Florida, Georgia, Illinois, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, New Hampshire, North Dakota, South Carolina, Tennessee, Virginia, West Virginia, Washington, and Wisconsin) have already adopted the Standard Railway Sanitary Code approved by the conference of the State and provincial health authorities of North America and later by the U. S. Public Health Service in con-

ference with the health officers of the United States. The essential part of the code has also been incorporated in the United States interstate quarantine regulations which apply to travel from one state to another.

The code looks to either the prevention of travel by infected persons or to the taking of measures to render such travel harmless; to the adoption of such general provisions as may render unlikely the transfer of infection to travellers by towels, drinking cups, and other objects of general use; and to the control of food and water on trains so as to protect them from contamination by the secretions of infected persons.

Delegates to Good Roads Convention.

Among the names of delegates appointed by Governor Trinkle to the U. S. Good Roads Association to meet shortly in Greenville, S. C., are noted the following: Drs. S. B. Moore, Portsmouth; C. F. Eason, Hickory; Sidney L. Scott, Fredericksburg; S. S. Guerrant, Callaway; R. W. Holley, Appalachia; J. M. Dougherty, Nickelsville; R. E. Booker, Lottsburg.

The American Gynecological Society

Is to hold its annual meeting at Hot Springs, Va., May 21, 22, and 23, under the presidency of Dr. John A. Sampson, of Albany, N. Y. Dr. A. H. Curtis, of Chicago, is secretary.

Dr. Dean Lewis,

Of Chicago, a man of national reputation and a true scientist, was the guest of the Richmond Surgical Society, on April the 6th, and read a paper on "Some Problems in Peripheral Nerve Surgery."

Norton to Have Laboratory.

The first branch of the State laboratory has just been established at Norton, Va., the Wise County board of supervisors having made the appropriation required for this purpose, together with funds already available. This new laboratory will serve the entire section of the State known as the Clinch Valley coal district. Norton was selected as the most easily accessible point of this section. Dr. W. R. Culbertson, Coeburn, Wise County Health Officer, and Dr. C. B. Bowyer, chairman of the medical committee which considered the establishment of the laboratory, deserve much credit for their work in health matters in Wise County.

Dr. J. A. Hart,

Recently of Norfolk, Va., is now connected with the U. S. Public Health Service and stationed at Hampton Roads Quarantine Station, Fort Monroe, Va.

Dr. George G. Howery,

Recently of East Radford, Va., has moved to Christiansburg, Va.

Dr. C. W. Thomas,

Floyd, Va., has been appointed a member of the Floyd County Board of Health, to succeed Dr. M. L. Dalton who resigned as he expected to locate elsewhere.

Dr. and Mrs. R. H. Wright,

Richmond, have returned home after a visit to Bermuda.

Dr. A. A. Cannaday,

Who has been in Miami, Florida, for two months, has returned to his home in Roanoke, Va., and resumed his practice.

Dr. Perkins Glover,

Arvon, Va., was a recent visitor in Richmond.

Dr. William P. Gilmer in Korea.

As we announced in a recent issue, Dr. William P. Gilmer, recently connected with the Chesapeake and Ohio Hospital, at Clifton Forge, Va., has entered medical missionary work in Korea. Word has been received of his safe arrival at Mokpo, Korea, where he will work under the auspices of the Southern Presbyterian Board of Missions.

Changes at St. Elizabeth's Hospital.

Dr. Warren T. Vaughan has resigned as attending physician to St. Elizabeth's Hospital. He will soon assume editorship of the *Journal of Laboratory and Clinical Medicine*, and this, with the increase in his private practice, consumes his time.

Dr. William H. Higgins will be head of the Medical Department of St. Elizabeth's Hospital beginning April 1, 1923. Dr. Higgins is well known in Richmond and throughout Virginia and the South.

Civil Service Examinations.

The U. S. Civil Service Commission announces open competitive examinations for: Junior pathological technician, receipt of applications to close April 24 to fill a vacancy in the Army Medical Museum, Washington.

D. C.; Junior biochemist, examinations to be held throughout the country on April 25, to fill vacancies in the Public Health Service; Inspector, antinarcotic act agent, and agent, antinarcotic act, receipt of applications to close May 15, these examinations to fill vacancies under the Internal Revenue Service of the Treasury Department.

Full information and application blanks for the three examinations listed above may be obtained from the U. S. Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. Civil Service examiners at the postoffice or customhouse in any city.

Dr. Richard W. Vaughan,

Recently of Richmond, has moved to Statesville, N. C., where he will continue the practice of his profession.

Standardization of Biological Stains.

The need for American made dyes for staining specimens in the laboratory diagnosis and investigation of disease became apparent when the war broke out and America was unable to obtain these stains from foreign source. For this reason the Society of American Bacteriologists began an investigation of American made dyes that were being sold as biological stains. The results of this investigation were encouraging enough to secure the assistance of the National Research Council through whose agency a co-operative investigation was planned among the members of several national societies. The work has now been organized under a special commission. At a recent meeting of the executive committee of this commission, it was shown that already the stains available in America are practically in all cases as good and sometimes better than the best of the pre-war stains. An important fact brought out at this meeting was that, while pre-war stains were standardized only in an empirical way by buying large batches without knowing the exact composition of the dye, they must now be standardized on the basis of pure chemicals.

The commission will shortly issue certification of definite batches of stain that have been found satisfactory. These stains will have a special label bearing the name of the commission. Certifications on labels not bearing the name of the Commission are made by the manufacturer or dealer and have not the approval of this commission. The Chemical

Foundation is supporting the work of this commission financially.

Dr. C. S. Dodd.

Petersburg, Va., has been named on the board of directors of the City Savings and Land Corporation, a new bank organized in that city.

Health Legislation in Sixty-seventh Congress.

During the four sessions of the sixty-seventh Congress, over 21,000 bills and resolutions were introduced in both branches. Of these only about 350 bills and resolutions were of direct interest to sanitarians. Of the 931 laws placed on the statute books during this Congress, only 31 have a direct bearing on public health.

The Association of Surgeons of the Southern Railway

Will hold its twenty-seventh annual meeting in Charleston, S. C., May 22 to 24, under the presidency of Dr. W. M. Cunningham, Corona, Ala.

The Virginia State Dental Association

Will hold its annual meeting jointly with the North Carolina Dental Society, at Pinehurst, N. C., April 30, May 1, 2, and 3, with headquarters at Carolina Hotel. Dr. W. M. Sturgis, Warrenton, is president, and Dr. Harry Bear, Richmond, secretary, of the Virginia Association.

Dr. George M. Cooper,

Raleigh, N. C., has been appointed assistant secretary of the State Board of Health of North Carolina.

Dr. Hubert Work,

After serving as postmaster general under the Harding administration, has become Secretary of the Interior and has taken his place as a member of the President's cabinet.

Dr. Fletcher H. Harris,

Henderson, N. C., has been appointed health officer of Vance County, North Carolina, succeeding Dr. B. A. Olds, resigned.

New York City Health Commissioner.

Dr. Frank J. Monaghan has been appointed health commissioner of the City of New York, to succeed Dr. Royal S. Copeland, who is now in the U. S. Senate. Dr. Monaghan has been the deputy commissioner.

Dr. Everett F. Long,

Raleigh, N. C., has been appointed director of county health work of North Carolina, to succeed Dr. Knox E. Miller, of the U. S. Public Health Service, who has been assigned to duty in Louisiana.

Dr. Robert A. Ashworth,

Moundsville, W. Va., has been elected secretary of the Marshall County (W. Va.) Medical Society.

New Hospital on Site of old One.

The old building on North Twelfth Street, this city, formerly used by the Retreat for the Sick, is being torn down to make space for the third of the buildings in the group to be used by the Medical College of Virginia. Plans for the building have not yet been worked out but it is understood that this building is to replace the present one used as Memorial Hospital, and that the new building will be connected by underground passage ways with the Dooley and St. Philip's Hospitals. This building will complete the hospital division of the Medical College of Virginia.

Dr. J. H. Crouch.

Recently of Smithfield, R. D., Va., has been appointed full time health officer of James City County, Virginia, with headquarters at Williamsburg.

Physician Wanted.

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Wanted:

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Obituary

Dr. Eugene Myron Herbert,

Of Roanoke, Va., died recently from influenza. He was born in Norfolk, Va., fifty-four years ago, and studied medicine at the Atlanta College of Physicians and Surgeons, from which he graduated in 1902. He then returned to Virginia and joined the Medical Society of Virginia the same year.

Dr. Andrew Browne Evans, Jr.,

Of Church View, Va., died March 18, after a short illness. He was a native of Middlesex County, Va., and was 49 years of age. He was a graduate of the Southern Medical College, Atlanta, in 1892. Shortly afterwards he located at Church View and had since practiced in that section. He is survived by his widow, a son and a daughter. Dr. Evans was at one time a member of the Medical Society of Virginia.

Resolutions of respect on the death of Dr. W. W. Rangeley.

The Montgomery County Medical Society, at a meeting on March 6, passed the following resolutions:

WHEREAS, God in his infinite wisdom has seen fit to remove from our midst our esteemed friend and co-worker, Dr. W. W. Rangeley, and

WHEREAS, He has been for a number of years a member of our County Medical Society, always true and faithful to his duties, and

WHEREAS, We recognize his ability, not only as a physician, but as a member of society in this community, to the extent that it will be a great loss, not only to the Medical Society, but to the community at large; Therefore be it

Resolved by the Montgomery County Medical Society:

First, That we, his colleagues, honor his memory because of the high and distinguished characteristics which signalized his life, both as a man and as a physician.

Second, That we revere his memory and accord him a position of prominence in the roll of distinguished physicians who have served the county and the state.

Third, That we express our sympathy to his bereaved family, and request that the secretary transmit these resolutions to them, and also spread these resolutions on the minutes, and publish them in the local press.

MONTGOMERY COUNTY MEDICAL SOCIETY.

By A. M. SHOWALTER, *Secy.-Treas.*

Dr. George Frank Lydston,

Of Chicago, died in Los Angeles, Cal., March 14, his death being due to pneumonia. Dr. Lydston was a native of California and was 65 years of age. He graduated from Bellevue Hospital Medical College, New York, in 1879, but, after service in several New York hospitals, located in Chicago, where he had

since made his home. He was professor of genito-urinary surgery and venereal diseases in the College of Physicians and Surgeons, Chicago, for many years. Dr. Lydston was also well known as a writer of ability and had made contributions to both medical and general literature.

Dr. Cyrus Lee Stevens,

Athens, Pa., an ex-president and for many years secretary of the Medical Society of the State of Pennsylvania, died February 19, after a long illness. He was prominently identified with the medical interests of his State as also of the American Medical Association, in which he was a member of the House of Delegates for six years. Dr. Stevens was for some time editor of the *Pennsylvania Medical Journal*.

Dr. Walker Gill Wylie

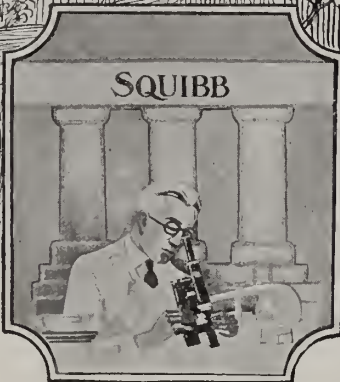
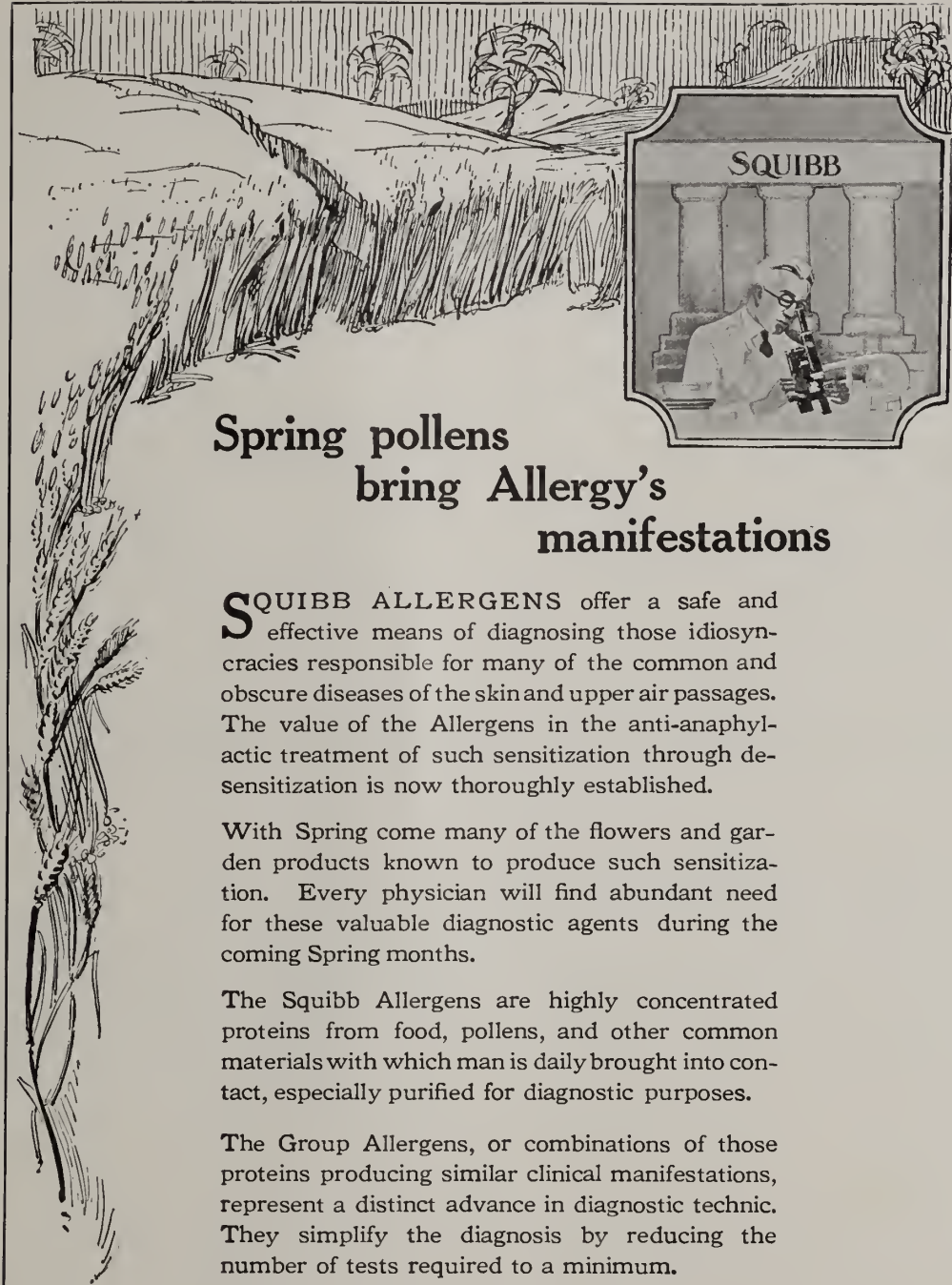
Died at his home in New York City, March 13, at the age of 75 years. He was a native of Chester, S. C., and, upon leaving the University of South Carolina, he served throughout the Civil War. Following his graduation in medicine from Bellevue Hospital Medical College, New York, in 1871, he went abroad to study the Nightingale system and, upon his return, established the first training school for nurses at Bellevue Hospital. He was for many years professor of gynecology at New York Polyclinic Medical School, having recently been made professor emeritus.

Dr. Lewis Coleman Morris,

Of Birmingham, Ala., and a prominent surgeon of that place, died suddenly while at dinner, March 23. He was born in Hanover County, Va., and owned the old home place there, which he visited every year. Dr. Morris was fifty-one years of age and graduated in medicine from the University of Virginia in 1892. He served there for one year as demonstrator in anatomy, after which he moved to Birmingham. His wife and three children survive him.

Dr. William Winston Snead,

Of Harlan, Ky., died in Louisville, March 17, from pneumonia following an operation. He was 44 years of age and a native of King William County, Virginia. Dr. Snead studied medicine at the University of Virginia, graduating in 1906. Shortly thereafter, he moved to Kentucky where he practiced medicine and was much interested in the civic and business affairs of his community. The interment was made in Richmond, Va.



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OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Fifty-fourth Annual Meeting, Roanoke, October 16-19, 1923.

Vol. 51- No. 2.
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RICHMOND, VA., MAY, 1923

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Virginia Medical Monthly

Official Organ of the Medical Society of Virginia

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WHOLE No. 851.

RICHMOND, VA., MAY 1923.

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Original Communications

SOME REACTIONS IN THE TREATMENT OF SYPHILIS AND THEIR PROBABLE SIGNIFICANCES.*

By S. G. GILL, A. B., M. D., Norfolk, Va.

The tendency in the recent treatment of syphilis is to render the drugs easier of administration; to cause less reaction to the patient, and at the same time to promote sufficient treponemicidal activity on the spirochaetae pallidae.

Our experience in the treatment of many luetic cases has convinced us that the more arsphenamin has been adulterated or changed to try to meet these requirements, the less potent has become the drug in its therapeutic effects, both clinically and serologically.

Thus, in a large number of cases of secondary and tertiary syphilis treated with as many as eight injections of the various compounds of arsphenamin and fifteen injections of mercury, the Wassermann has become unaffected or to a greater degree positive, while similar conditions treated at the same time with arsphenamin, there has been a more marked clearing up of lesions and symptoms and an appreciable percentage of persistent negative Wassermann tests. We came upon this conclusion on experimentation of cases that were serologically and clinically as similar as possible with due regard to previous treatments, if any, and length of the disease.

Neo-arsphenamin has been condemned by public assent and relegated to a secondary place in the rank of arsenicals.¹ However, on account of its comparatively low toxicity and freedom from severe reactions, we have found it useful in certain cases.

In the treatment of debilitated syphilitics—especially those persons suffering with con-

comitant tuberculosis, of which we have many, or valvular diseases, or even when they are weakened by the ravages of syphilis itself—we have found it profitable to carry them through a course of neo-arsphenamin and mercury until they have regained enough strength to react properly to arsphenamin.

Silver salvarsan is passing through a hectic period of diversified opinion as to its efficacy. To date it is impossible to arrive at a definite conclusion as to its efficiency.

Arsphenamin and its substitutes, for subcutaneous injection, have already been studied experimentally.²

Mercury in many forms has been used in the treatment of syphilis, as rubs, intramuscularly, inhalations, internally and intravenously. Of late the intravenous methods of administration seem to have met with success by several prominent syphilographers and bacteriologists.

Thus it is interesting to note that arsphenamin and its compounds, as well as mercury in its different forms, are running the gamut of new compositions and of varied methods of administration.

Having already rendered arsphenamin easier of administration by using a few simple additions to the salvarsan gravity apparatus,³ we tried to experiment with the two other main issues in successful treatment, viz.—“to cause less reaction to the patient and at the same time to promote sufficient treponemicidal activity on the spirochaetae pallidae.”

In order to try to eliminate some of the reactions, we tabulated them in a series of over one thousand administrations of arsphenamin and neo-arsphenamin in various dosages. In our series we found that we had better clinical and serological results in those that showed reactions to the drugs, but in some cases we were able to eliminate or ameliorate the unnecessary reactions.

GENERAL CLASSIFICATION OF REACTIONS.

The reactions are classified as to male and female and the following types:

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1. Nitritoid, or those that showed vasodilatation, or immediate reactions.

2. Vomiting.
3. Chills and fever.
4. Diarrhea.
5. Slight malaise.
6. Severe.
7. No reaction.

The arspenamin was administered by gravity and modification of gravity, and the neo-arsphenamin was diluted to make 10 c.c. of solution.

After thoroughly testing out both methods of administration of arspenamin, we found no appreciable difference in the reactions. A slightly concentrated solution was used because we had only one available table, and many patients to treat. In debilitated patients, as stated before, we first used neo-arsphenamin, but later on, when the patient's condition became stronger, used either drug. Some cases were given one drug through a whole course, and some the other respectively.

In 473 injections of arspenamin given to men, 358 had no reaction, and 115 or 24% had reactions of some description. In 226 injections of arspenamin given to women, 145 had no reaction and 81 or 35% had reactions.

In 170 injections of neo-arsphenamin given to men, 136 showed no reaction, and 34 or 2% showed reactions. In 223 injections of neo-arsphenamin given to women, 143 gave no reactions and 80 or 35% had reactions.

It is interesting to note that we had more reactions in women and that they showed the same percentage of reactions to arspenamin and neo-arsphenamin.

Nitritoid Reactions.—Nitritoid reactions occurred more often in women and in some cases were unaffected by dosage or method of administration. Of the sixteen such reactions in women, we found definite lack of ovarian secretion, either caused by previous operations or diseases of these organs. By the internal administration of ovarian substance, beginning five days before subsequent administration, we were able to eliminate this reaction in about 90% of these cases. As examples of this we will relate two cases: On March 14, 1922, two women had severe nitritoid reactions from .6 gms. neo-arsphenamin. Both these subjects had had their ovaries removed some years previous. Ovarian substance was prescribed for both of them and with the following tabulated results. March 21, 1922, neither had any

reaction from .6 gms. neo-arsphenamin. March 28, neither had reaction from .4 gms. arspenamin. April 3, neither had any reaction from .6 gms. neo-arsphenamin. On April 11, 1922, no reaction from .4 gms. arspenamin, and so on until May 9, 1922, when one of them had a severe nitritoid reaction from .6 gms. neo-arsphenamin. This woman had discontinued taking her ovarian substance a few days previous.

Although the nitritoid reaction has never proved a serious one and usually can be readily controlled by the hypodermic administration of adrenalin, it is very distressing to the patient and also delays the physician when he has a large number of patients to treat in a short time. We have lately made it a rule to particularly get a history from every woman applying for treatment in regard to her previous operations and her menstrual condition.

There is one more case in this series that is probably interesting. Mrs. T., whose husband had recently died of neurosyphilis, had a 4+ Wassermann test May 16, 1922. This was about her usual time to menstruate. She received nine injections, .6 gms. neo-arsphenamin and nine injections mercury between this date and August 1, 1922, during which time she had had no menses. She had no reaction until the last injection August 1, 1922, at which time she had a marked nitritoid reaction, and one day afterwards her menstrual flow commenced. We assumed that the internal secretion of her ovaries was sufficient up to the time of her ninth injection. It may appear to some that we have laid too much stress on organotherapy in combating nitritoid reactions in these women, yet it has proven more satisfactory than the previous hypodermic administration of adrenalin.

Nitritoid reactions in men, in our series, were not as severe as those in women. Of the eleven cases we had, all were easily controlled by the hypodermic injection of adrenalin.

Vomiting.—In our series vomiting was the most consistent form of reaction with the exception of slight malaise. Some cases reacted at once, and others a few hours after the injection. Thirty out of 473 injections of arspenamin in men, or 6%, had this reaction. Forty of the 226 women injected with arspenamin, or 17%, vomited. Fifteen out of 170 men injected with neo-arsphenamin, or 8%, and 20 out of 223 women injected with neo-

arsphenamin, or 8%, vomited. A large number of these cases were from the City Jail and, although given proper instructions as to diet, several of them paid no attention to directions at all. A certain percentage of these cases ate fruit several hours or just before the administration of the drug. We found that the ingestion of acid fruits and the condition of having overloaded stomachs probably caused the majority of these reactions; however, there were some patients who had this reaction notwithstanding the fact that they apparently carried out our instructions as to diet.

Chills and Fever, Diarrhea and Malaise.—Chills and fever, diarrhea and malaise were reactions that we did not consider of much importance. The liberation of toxins from the destruction of the spirochetes would necessarily cause a reaction and in proportion to the amount of secondary eruption or localized infection.

The percentage of cases having malaise were as follows:—

- 42, or 8%, in arsphenamin to men.
- 25, or 11%, in arsphenamin to women.
- 11, or 6%, in neo-arsphenamin to men.
- 41, or 18%, in neo-arsphenamin to women.

Severe Reactions.—Of the five severe reactions we were able to tabulate, the outstanding significance is that the Wassermann test became negative; and of the four with whom we have kept in touch, none has as yet showed a reversion to a positive test. It is true that we have only had these cases under observation for from five to nine months after their severe reactions. All these cases are in good clinical condition; however, we realize that a further study is necessary.

We have had the idea and the conviction for some time that the ideal treatment for syphilis would be to give as large doses of arsphenamin as the patients can tolerate. A reaction is more to be desired than condemned, provided the incidental, useless causes can be eliminated. These causes would embrace a large variety of functional and organic conditions that could be treated in order to enable a larger dose of arsphenamin to be administered.

Insufficient treatment of syphilis is worse at times than no treatment at all. "Ehrlich's explanation of neurorecurrence is based on the theory of a sterilization which just falls short of being complete."²⁴

It has been our experience in the treatment

of syphilis with arsphenamin that we will get reactions quite frequently if a large dose is given. We have found, however, that the results justify maximum doses, provided one has the facilities for after treatment and for proper care of the patient. We, therefore, recommend maximum doses of arsphenamin for syphilitic patients when it can be tolerated, but strongly advise individual treatment to meet the existing conditions of the patient.

No doubt there are many ways to eliminate unnecessary severe reactions. When these avoidable reactions have been excluded and the patient is given the largest doses conforming to safety, we believe the results will be better than using any standard universal dosage.

We realize that we cannot come to any definite conclusion as to therapeutic efficiency based on as few as five cases, yet it is a significant fact that these were the only severe reactions we were able to tabulate. None of these cases, at any time during their treatments, showed any marked nitritoid reaction except those having Jarisch-Herxheimer reactions, and the severe reactions came on within one to five days after the administration of arsphenamin. Two of these cases had definite hepatic symptoms, one had exfoliative dermatitis, and two can probably be classified as having quite severe Jarisch-Herxheimer reactions.

We will report in brief one case of each form of these reactions.

CASE I. Exfoliative Dermatitis.—R. W., White, male, age 21, single man. Seen by us October, 1921. He had had the diseases of childhood, including articular rheumatism.

Examination.—Patient had had for two months a chancre on lower lip and an enlarged gland just beneath right lower jaw. He had mitral regurgitation, moderate amount of albumen in his urine and a kyphosis due to his rheumatic attack. Wassermann test 4+.

Treatment.—He received weekly injections, .4 gms. arsphenamin and one gr. soluble mercury, with only slight reactions until the fourth injection of arsphenamin, November 30, 1921. Four days after this injection, patient noticed an itching sensation all over body and legs. Next day he had an urticarial like rash over body and legs. Treatment discontinued.

Five days later I was called to see patient, and at this time he had large vesicular erup-

tion over body, face, scalp, feet and penis. His eyes were completely closed from the swelling of the surrounding tissues and his breath very foul.

His condition became critical; he could not move in bed on account of weakness; there was a continuous dripping discharge from the breaking of the vesicles; at times he suffered from anuria and constipation.

Later on his skin became very scaly all over his body and extremities and, each time olive oil was applied and warm sponge baths given, a large amount of desquamated skin came off and pinkish new skin would show underneath.

On January 8, 1922, patient had regained his strength and there were large spotted brownish discolorations all over his body. Wassermann negative.

April 14, 1922, Wassermann negative.

August 21, 1922, Wassermann negative.

September 15, 1922, Blood Wassermann and spinal fluid Wassermann negative.

Comment.—The patient's weakened condition and the possibility that there was a slight Herxheimer reaction before the last injection given to the patient, may have been the cause of his severe reaction.

Liver Reactions with Jaundice.—"Milian states that in 2,125 injections of arsphenamin, he has observed jaundice and liver symptoms 17 times. He found that jaundice usually does not appear until about two months after treatment, and that it usually developed in those who had received insufficient treatment."⁵

CASE II.—Mrs. S., age 49, white. Had diseases of childhood, malaria and dyspepsia. Husband died of rheumatism and syphilis ten years previous. On admission she had had rheumatism and occipital headache six years. Wassermann 4+.

Patient took seven injections arsphenamin and six injections mercury with no reaction. Three days after the eighth injection of arsphenamin, she had an urticarial like eruption over body and at the same time her face and feet swelled up very much and became purplish colored. These symptoms lasted about two weeks. Her urine was negative for albumen, but filled with bile. Her liver was very much enlarged.

As soon as eruption left, her eyes and skin were markedly jaundiced. Two weeks later patient complained of pain in her back. At this time no jaundice but slight palpitation of the heart.

Patient recovered in about two months after her severe reaction and felt well. She has had a continuous negative Wassermann test for six months.

This woman had her menopause just about the time of her severe reaction. She menstruated regularly one year before taking treatment, twice the month she had severe reaction, and has not menstruated since.

Jarisch-Herxheimer Reaction.—"This reaction consists in the exaggeration of the pathologic and hence the clinical processes, following the administration of antisyphilitic medication. Clinically, it is noted that the lesions become of a brighter color, and that some swelling usually takes place."⁶

CASE III.—Miss M., in 1919, started taking treatment for syphilis. At that time her Wassermann test was 2+. After her first course of treatment, her Wassermann was 4+. This woman, after having taken treatment for over a year, and after having had a continuous 4+ Wasserman test, was given two courses of treatment, consisting of 8 injections of neoarsphenamin and 15 injections of soluble mercury each, after which her Wassermann was 4+. During the third course of treatment given her by us, which consisted of administration of arsphenamin and mercury, she developed a rash over her body, and both knees became swollen and red. She had a negative Wassermann test a few weeks later. Unfortunately, we have been unable to see this woman again to get any more tests on her, but we understand she is still living in this city.

SIGNIFICANCE OF CONDITIONS ASSOCIATED WITH SYPHILIS.

It is well to bear in mind that though a patient may have well defined clinical and serological syphilis, yet the very condition for which he seeks relief is some concomitant unassociated lesion. There is a tendency of late years, since the Wassermann test has become so popular, to relegate a case for syphilitic treatment, as soon as this test is found to be positive, not always taking into consideration that this may be only one of the diseases with which the patient is afflicted.

One case that proves this significance came to us recently. A negro had been treated locally for an ulceration on his penis which, when seen by us, looked as if a penile amputation would be necessary in order to save

other structures. He had typical skin lesions of syphilis, and the bony septum of the nose was partially destroyed.

Three injections of arsphenamin cleared away the lesions on his skin, but the ulceration on his penis continued to spread, two other similar ulcerations appearing on the inner side of left testicle, and inner side of left leg respectively.

We tried intravenous injections of tartar emetic for granuloma inguinale, and the patient's genital lesions improved after the first dose, showing continuous betterment until cured. The patient is now under syphilitic treatment.

This case is cited to illustrate the clinical significance in the treatment of syphilis associated with some other disease, and it is always well to bear in mind that, although a patient may have syphilis, he may have other contemporaneous diseases as well, along with other symptoms due to these diseases.

CONCLUSIONS.

1. In our series of cases, arsphenamin and neo-arsphenamin are both useful in the treatment of syphilis, but the former is more potent and should be used whenever practicable.

2. A great many useless, unnecessary reactions from the administration of the drugs can be eliminated, thereby increasing its usefulness. No attempt has been made to incorporate in this paper every method that we have tried out to avoid these reactions.

3. There are very often many diseases and conditions associated with syphilis that we must not expect to respond to luetic treatment.

4. That, although in our series the severe reactions were followed by negative tests and eventually clinical improvement, we hope some day to be able to increase the tolerance of the drug to the desirous therapeutic effects without these distressing phenomena.

ARSPHENAMIN REACTIONS.

Men

			No re- action	Ma- laise	Chills & Fever	Diar- rhea	Vomit- ing	Nitri- toid	Severe
75 cc. .6	Gm.---	194	30	12	3	12	2	1	
75 cc. .4	Gm.---	115	8	10	5	12	0	1	
100 cc. .45	Gm.---	10	0	0	0	0	1	0	
50 cc. .4	Gm.---	8	0	0	0	0	1	0	
100 cc. .6	Gm.---	31	4	0	4	6	3	0	
		358	42	22	12	30	7	2	

Women

			No re- action	Ma- laise	Chills & Fever	Diar- rhea	Vomit- ing	Nitri- toid	Severe
75 cc. .4	Gm.---	88	25	1	4	30	4	3	
100 cc. .45	Gm.---	28	0	0	1	6	1	0	
50 cc. .4	Gm.---	3	0	0	0	3	1	0	
100 cc. .4	Gm.---	26	0	1	0	1	0	0	
		145	25	2	5	40	6	3	

NEO-ARSPHENAMIN REACTIONS.

Men

10 cc. .6	Gm.---	114	8	1	1	11	4	0
10 cc. .9	Gm.---	12	1	0	2	3	0	0
10 cc. .7	Gm.---	10	2	0	0	1	0	0
		136	11	1	3	15	4	0

Women

10 cc. .6	Gm.---	143	41	7	2	20	10	0
Total-----		783	119	32	22	105	27	5

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Dickson Building.

LUMBAR PUNCTURE IN THE ROUTINE TREATMENT OF SYPHILIS.*

By WARREN T. VAUGHAN, M. D., Richmond, Va.

Many cases of syphilis are treated routinely with intravenous arsphenamine, mercury and iodides, with no investigation whatsoever of the reaction of the spinal fluid. In the majority of instances the duration of treatment is controlled by the intensity of the blood Wassermann reaction, no attention being paid to the possible persistence of a positive spinal fluid after the blood has become negative. In a large proportion of late neurologic syphilides with positive spinal fluids, the blood Wassermann is negative. I wish to present a few cases in which these facts are well established and to suggest remedial measures.

Mr. M., when first seen, complained of "an unbalanced feeling." The patient was a mid-

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de-aged man with an alcoholic history and a story of having had gonorrhoea several times and a chancre twenty-five years previously. He was married, had four children, none of whom apparently showed signs of congenital lues. His wife had had no miscarriages. He had received only local treatment for his chancre, and had been told that secondary lesions did not develop. Two years before the first examination he had developed some unsteadiness in walking, with slight impairment of vision and urinary incontinency. He then received two intravenous doses of salvarsan and potassium iodide. Within six months the blood Wassermann had become negative, and treatment had been discontinued, but the symptoms progressed. Examination at the first visit showed typical Argyll-Robertson pupils, absent knee-jerks and Achilles jerks, a positive Romberg, and impaired co-ordination in the lower extremities. The liver was enlarged. Systolic blood pressure was 160. Lumbar puncture was performed, and the spinal fluid showed 20 cells per cubic mm., and a positive globulin reaction. The blood Wassermann was negative. The spinal fluid Wassermann was four-plus, with .5 cc. of fluid.

Here is a case with insufficient intravenous treatment, in which no attention was paid to the central nervous system until after irreparable damage had occurred, when the spinal fluid was found to be still strongly positive.

Mr. W., when first seen complained of inability to walk well. Fourteen years previously he had developed a genital chancre which was followed in due time by a secondary rash. He took mercury inunctions and medicine internally for a period of two years. Four or five years later he complained of feeling "light-headed," and later noticed that he could not walk straight. Two or three years after this he began experiencing sharp shooting pains in his hands and his feet, with occasional twitching of the muscles of the extremities. During the two years previous to the first visit he had had rather indefinite abdominal pains, intermittent in character, never severe, and not connected with his meals. On physical examination the pupils were found to be Argyll-Robertson in type, and the tendon reflexes were all absent. There was marked ataxia of the upper and lower extremities, and the patient was scarcely able to stand without support. The blood pressure was slightly elevated, the systolic being 170. A diagnosis was made of

tabes dorsalis and hypertension. The blood Wassermann reaction was negative, while the spinal fluid Wassermann was four-plus with .2 cc. of fluid. The cell count was 76, all lymphocytes, and the globulin was increased, four-plus.

Mr. L., aged 49, first complained of dizziness, weakness in the legs, and inability to walk straight. From the examination, a diagnosis was made of syphilis of the central nervous system, chronic nephritis, and hypertension. He was treated over a period of several months. Throughout the period of treatment the blood Wassermann was constantly negative. The original spinal fluid Wassermann was positive, and the cell count, 16. Under treatment the cell count fell to 2 per cubic mm., and the spinal fluid Wassermann improved so that it eventually became two-plus and, to obtain this reaction, 2 cc. of spinal fluid were necessary. There was considerable subjective improvement.

Mr. O., aged 62, when first seen, complained of pains in the legs and arms of twenty years' duration, and so severe as to require the use of morphine. He had had a gonorrhoeal infection when young, and a chancre with satellite bubo but no secondary manifestations, twenty-five years previously. He had had various therapeutic measures applied for his symptoms, among which had been the extraction of all of his teeth. He had received one course of mercury. His nervous symptoms had started with headache, but later the pains had passed into the extremities and disappeared from the head. The attacks consisted of typical crises coming on three or four times a year at first, but steadily increasing in frequency, and relieved only by the use of morphine. He complained of pains in the legs, griping pains in the abdomen, marked constipation, and formication and ataxia at night. Again the pupils were Argyll-Robertson in character, unequal and irregular. The tendon reflexes were absent, there was a positive Romberg, some roughening over both tibiae, and a tendency to a positive Babinski in the right foot. In this foot there was a loss of pain sense, with preservation of tactile, muscle and temperature senses. The patient also had a typical tabetic bladder. A diagnosis was made of tabes dorsalis, secondary anemia, chronic cystitis and chronic morphinism. The blood Wassermann was negative. The spinal fluid Wassermann was four-

plms with 2 cc. The cell count was 0, and the globulin test negative.

The following cases differ from those just described, in that the blood Wassermann was negative, in spite of the fact that the patients had never received antiluetic treatment.

Miss F., aged 29, first complained of nervousness and of weakness of the left leg. Venereal disease was denied both by name and symptom. Eight months previous to the first examination her left leg below the knee began to feel weak, and she had experienced some difficulty in walking, particularly in climbing. The symptoms gradually progressed, and there had developed a sensation of numbness in the same extremity. At the same time the right upper eyelid had begun to droop and to swell. She had also noticed that the right pupil was larger than the left. She consulted a physician, who put some drops in the right eye, and the pupil became temporarily smaller. She complained of some blurring of the vision, and occasional diplopia. Physical examination showed a perforated nasal septum, unequal pupils which did not react to light but did react well to accommodation, absent knee jerks and ankle jerks, and a marked swaying in Romberg's position, with considerable difficulty in turning about quickly. A diagnosis was made of *tabes dorsalis*. The patient had never had antiluetic treatment. The blood Wassermann was negative. The spinal fluid Wassermann was four-plus with 1 c.c.; cell count 14, all mononuclears. Spinal fluid globulin was one-plus.

Mr. G., aged 42, first complained of pains in his chest. His family history and past history were both negative. Six months before admission he had had a double hernia operation. Four months before admission he had first experienced a poorly described pain in the skin over the chest. This persisted constantly, but was never very severe. On examination he was slightly irrational. The pupils were sluggish, irregular and unequal. The tendon reflexes were all exaggerated except the Achilles reflexes, which were present but obtained with some difficulty. A diagnosis was made of *dementia paralytica*. The patient denied both gonorrhoea and syphilis, and had, so far as he knew, never received anti-syphilitic treatment. The blood Wassermann was negative, but the spinal fluid reaction was four-plus. The spinal fluid cell count was 20, all lymphocytes, and the globulin was two-plus.

Summarizing the cases so far described, we may emphasize that a negative blood Wassermann does not rule out syphilis of the central nervous system, neither in those cases which have undergone routine antisyphilitic treatment nor in some cases in which there has been no previous treatment whatsoever. Where symptoms or signs point to a possible central nervous involvement, a diagnostic lumbar puncture should be performed, even though the blood reaction be negative and even though there is a negative past history both for infection and for treatment.

The converse is likewise true, as we shall see in the following cases. Individuals with positive blood Wassermanns, having no central nervous symptoms or signs, may yet have positive spinal fluid Wassermanns. In these cases particularly, the fact should be recognized early, and the condition of the spinal fluid should be followed as a guide, together with the condition of the blood Wassermann and the clinical findings.

Mrs. K., aged 31, was admitted with a traumatic ulcer on the right leg. The ulcer had persisted for a year, nearly healing, only to break down again. She had no nervous symptoms and no neurologic symptoms. The pupils reacted both to light and distance, although the reaction to light was poorly sustained, there being a moderate hippus. The patient was somewhat euphoric, although not pathologically so, and there was no memory defect and no defect of judgment. The blood Wassermann was four-plus. The spinal fluid was four-plus with .2 cc., cell count 18 per cubic mm., all mononuclears, and the globulin two-plus.

Mr. B., aged 60, entered complaining of pains in the abdomen and back. He knew that ten years previously he had contracted syphilis, and had developed the usual secondary lesions. Treatment had consisted of mercury pills by mouth three times a day over a period of three years. After this for several years he had taken the same pills for three or four months each spring. He had remained well until three months before the first visit, when he had developed attacks of epigastric pain, coming on immediately after breakfast, and relieved by the taking of food. They also occurred at night after he had retired. The blood Wassermann had been positive five years previously, and was again positive when the patient was first examined. Detailed neuro-

logic examination was entirely negative. The patient felt that his memory had become impaired during recent years. The spinal fluid Wassermann was four-plus with .3 cc., cell count 30 per cubic mm., 97% mononuclears and 3% polynuclears, and the globulin reaction was three-plus. A diagnosis was made of syphilis, syphilis of the central nervous system and dementia paralytica.

Mr. G., aged 65, has had recurrent attacks of rheumatism since the age of 35, with some indefinite pains in the stomach usually worst during wet weather. Fourteen or fifteen years previously he had had a nervous breakdown of indefinite description, but in which he had been extremely ill. There had been a slow convalescence therefrom. On admission, he was suffering from palpitation and dyspnea on exertion. The only neurologic symptom consisted of numbness and "pins and needles" sensation in the right hand. There were no objective neurologic findings whatsoever. The blood Wassermann was four-plus, and the spinal fluid reaction four-plus with .3 cc.; globulin two-plus. Cell count was not made because of the presence of blood in the spinal fluid.

Mr. B., aged 51, complained of frequent micturition, with a throbbing in his head at night. Eleven months previous to admission he had contracted a chancre, which was followed by secondary manifestations, and was treated by two intravenous injections of salvarsan five weeks apart. This had relieved all of his symptoms except the sensation in his head and the frequent micturition. Physical examination was essentially negative except for right middle ear deafness and rather hyperactive reflexes. The deafness was found to be due to a large accumulation of wax in the ear. Bone conduction was normal. The blood Wassermann was four-plus, spinal fluid Wassermann was four-plus with .4 cc., cell count 11, globulin one-plus.

These patients showed positive spinal fluid findings in spite of absent or minimal signs of cerebrospinal involvement. Conversely, again, it occasionally happens that undoubted syphilitic nervous lesions may occur in the presence of a negative spinal fluid. The spinal fluid reaction is determined chiefly by the extent of involvement of the meninges. With purely cortical or cerebral vascular invasion in the absence of meningeal irritation the spinal fluid may be expected to be negative.

The following case, with signs pointing to cerebral vascular damage, showed a positive blood Wassermann and a negative spinal fluid Wassermann, but positive cytologic findings in the fluid.

Mr. D., aged 31, complained of numbness of the left side, of four years' duration. At the onset he had evidently had a cerebral vascular lesion, which had started with numbness of the left foot, quickly spreading over the entire left side, followed by unconsciousness and then delirium, from which he slowly recovered. Three years later he had a second similar attack. On physical examination the tendon reflexes of the left side were all exaggerated, and cutaneous sensation over the entire left side was diminished. There was a positive Romberg, and marked ataxia over the left arm and leg. The surface temperature of the left hand seemed somewhat lower than that of the right. There was no muscular impairment. The findings were otherwise negative. This patient showed a four-plus blood Wassermann, and negative spinal fluid Wassermann with 2 cc. on two examinations. The spinal fluid cell count was 40, all mononuclears, and the globulin two-plus.

Examination of the spinal fluid for Wassermann reaction alone is not sufficient. Both the cell count and globulin may be increased, with a negative Wassermann. As Fordyce, Wile and Stokes have all pointed out, in early syphilitic lesions, particularly the early secondary stage, the cell count is customarily increased before the spinal fluid Wassermann becomes positive. Thus, Mr. M., with a chancre of the lip and an early secondary eruption, a four-plus reaction of the blood and a negative reaction of the spinal fluid, showed an increased globulin content and a cell count of 35. There were no neurologic signs or symptoms. Here is a case in which treatment will not be completed until after we have convinced ourselves that the spinal fluid findings as well as the blood findings are negative. It is this type that, untreated, is prone to develop the late neurologic accidents.

Of course, as far as the patient is concerned, it would be of no advantage to study the spinal fluid if the treatment were not to be guided by the findings. Thus, there are those who claim that intraspinal therapy is unnecessary; that the results from intravenous treatment alone are entirely satisfactory. But, if this were true, the only method of

proving it would be by examination of the spinal fluid for evidence of complete cure. A second group of syphilographers contends that in cerebrospinal involvement intravenous therapy should be supplemented by spinal fluid drainage—while yet another group holds that for proper treatment salvarsanized serum should be given intraspinally in conjunction with intravenous treatment. Dercum is among the leading proponents of spinal drainage, while Fordyce, who has had an extraordinary experience in the treatment of cerebrospinal syphilis, is firmly convinced of the superiority of intraspinal therapy.

Time does not permit a summary of the evidence for and against the three methods of treatment, but the weight of evidence indicates that intraspinal administration of salvarsanized serum has a distinct field and should be employed in all cases in which intravenous treatment has not satisfactorily cleared up the central condition. For satisfactory results intraspinal treatment must be begun early. Tabes and taboparesis when usually recognized are past cure and usually past improvement. The future hope of therapeutic advancement in this field consists in early recognition of neural involvement and intensive treatment before the appearance of localizing signs or symptoms. The routine which I have followed consists in the giving of an initial course of intravenous therapy, followed by re-examination of the spinal fluid. If improvement is noted the method of treatment is not changed. If no improvement in the spinal fluid findings has occurred intravenous treatment is reinforced by intraspinal therapy, using the Swift-Ellis technique. In cases of early secondary syphilis it is safer to give three or four intravenous treatments before performing the initial lumbar puncture, so as to lessen the hazard of meningeal invasion subsequent to the puncture itself.

CONCLUSIONS.

A negative blood Wassermann does not rule out central nervous system syphilis, even in those cases who have had no anti-luetic treatment. In case of doubt, a diagnostic lumbar puncture will give valuable information. The intrathecal pressure should be roughly estimated, cell count and globulin content should be recorded, and Wassermann reaction should be determined. Recently we have also been employing the colloidal gold reaction as a con-

trol for the Wassermann. It is important to use amounts of fluid up to 2 cc., in the Wassermann test, so that a weak positive will not be overlooked.

No case of syphilis can be said to be successfully protected against late neurosyphilis until the spinal fluid has been studied and found to be normal.

Early treatment of neurosyphilitic lesions, before the development of localizing signs, offers the only promise, at present, of satisfactory therapy. Spinal fluid examination affords the only means of recognizing this early involvement.

Every syphilitic should have at least one lumbar puncture performed, early in the course of his disease.

404 *Professional Building.*

A PLEA FOR A MORE COMPREHENSIVE VIEW OF THE CORRELATIONS IN THE STUDY OF MEDICINE.*

By J. H. HIDDEN, M. D., Pungoteague, Va.

The subject is so broad and many-sided, so mingled and intermingled with every department of medical science, that it may be designated as almost as broad as the study of medicine itself. The physician of only average ability, with a very limited degree of culture, merely grasps a bird's-eye view of the subject, while the accomplished, matured physician, with his analytical powers well trained in medical thought, with his intellect stimulated with the rich accumulations of knowledge, stands, at times, appalled, as he sees far beyond his ability to advance. He soon realizes that it is not a mere theoretical view of an almost unlimited degree of learning for which we are struggling; but a practical, intimate knowledge of the various departments of the science that can be skilfully and effectually used for the relief of human sufferings and for the cure of disease. This decision is not only individually, but is generally correct, provided such a decision is not reached by the physician until he has accumulated sufficient general knowledge to act as a safe and scientific balance in his chosen field of work, otherwise, this view becomes questionable, oftentimes embarrassing and, in some cases, even dangerous to the welfare of the public.

The correlations of medicine may be divided into several headings: (1) "Those having re-

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ciprocal or mutual relations; (2) Those manifesting a relation of parallelism; (3) Those showing interdependence of structure, organs, functions or natural forces." In this paper, however, I shall not follow any definite order, for my object is not to give any logical, symmetrical discussion of the subject, but only to throw out some suggestions for the stimulation of further thought. The classification itself is purely artificial and is by no means well-defined; for the correlations of medical study are so numerous and, as I have before intimated, so intimately associated in this great fabric of medical science, that they may be often seen and studied under almost any classification you may suggest.

Within the last decade an increased interest in the reciprocal or mutual relationship of the vital structures, organs and functions of the human body has been awakened by the brilliant work of Dr. George Crile. This is especially true in the field of the endocrine system. And though his materialistic view of these correlative forces, expressed in his so-called "Mechanistic activation of the kinetic drive," has introduced more complex problems than he has ever solved, his work still stands out as a remarkable stimulation to modern medical thought. In addition to Dr. Crile's work, with the great volumes of literature that have appeared in our standard medical journals within the last two or three years, where is the physician, who does any thinking for himself, who has not been deeply impressed with the potent properties of the ductless glands? And where is the physician who does not feel the need of a more intimate knowledge of these organs, not only in their relation toward each other, but also in their relation to the complex cardio-vascular system, the phenomena of the nervous system, and indeed, the entire nutritional processes of our whole anatomical structure?

Yes, this awakening has come, and it is a daily observation in medical circles that a deficiency of study, and consequently, a lack of practical insight along these lines is often responsible for some of our most humiliating failures in the diagnosis and treatment of a certain class of our patients. For instance, we read and hear volumes of discussions of the hyper- and the hypo-thyroidism, and theoretically we are fairly well informed upon what we have read; but for all practical purposes oftentimes the reader has really taken in only

two pictures of these disorders, namely, exophthalmic goitre and myxedema. All the intermediate disorders of thyroid toxicity or deficiency are only hazy, complex problems for some of the specialists or group practitioners. While this state of professional deficiency exists among so many of our general practitioners, many of these poor sufferers pass from one physician to another without finding relief and, in their desperation, often seek aid from the osteopath or some other quack. More often, however, they are sent to some hospital surgeon in whose hands they finally undergo an exploratory laparotomy.

Now, this is no imaginary picture. It has been a common occurrence all over the country. I have at present three cases in my own practice—each giving this history—all undergoing exploratory laparotomies to no appreciable advantage. They were all finally diagnosed as sufferers of thyroid deficiency. I may also add, they were all rapidly restored to health by treatment with thyroid extract.

As these cases represent striking illustrations of the lack of practical clinical insight into the intermediate state of thyroid deficiency, let us examine their history a little more closely. One of these cases had been repeatedly diagnosed as hysteria, one as neurasthenia, and the last as a sort of neurotic phenomenon, better suited for the diagnosis of the Almighty Himself. A review of the history and symptoms of these cases calls for no justification of these repeated diagnostic and therapeutic failures. They were all cases of obesity with more or less abdominal and tympanitic distention, with, at times, simple pelvic congestions with disturbed menstrual disorders of the menorrhagic type. They were all patients with weak hearts, slow and irregular pulse and low blood pressure. Moreover, these patients were subject to varied and multifarious attacks of neuralgia, digestive disturbances, neurotic irritations and evidences of lowered metabolism. They also gave a more or less swollen appearance in their faces, and finally, suggestions of arrested mental development. It certainly seems here that an intimate knowledge of the correlations of medical science ought to have aroused a strong suspicion of thyroid deficiency in these poor sufferers, and yet they suffered for years before the dominant, etiological factor in their pitiful conditions was discovered. It may be asked: who was responsible for all this suffering?

Again, a closer and a more comprehensive study of the correlative relations of the structures, organs and functions of the human body is becoming more essential each day to meet the requirements in the social changes of modern life. Indeed, under our political, social, economic and domestic conditions, we find a frequent perversion of almost all the secretory structures of our entire organism. And, at times, many of these structures or organs may be involved in any given case. As a result of these conditions, the number and variety of neurotic disturbances occurring annually in almost any well populated community are simply appalling, requiring the most discriminating sagacity in ferreting out their respective etiology and in making correct classifications. Moreover, this work must be often done by clinical observations alone.

Indeed, in many cases the laboratory gives little or no assistance, and often what is given is only of a negative character. Under such circumstances the physician who has developed keen clinical insight is the one who is in demand. On the other hand, the less observant physician who depends almost entirely upon laboratory assistance from the technician to form his conclusions in any given case is so often a pronounced failure. Please understand I am not depreciating laboratory work. We all recognize that in many cases this is indispensable, but it is too often used as a sort of substitute for professional alertness in clinical observations. And as this alertness in our clinical vision is allowed to become more or less dormant in our daily service, we are sure to deteriorate in this important line of our work. In other words, we are simply gaining in one direction and losing in another. Real progress demands a gain in both directions. If either department of medicine must be neglected by the practicing physician, let it not be the clinical; for deficiency here, in the long run, means failure.

With this brief digression from my last thought, dealing annually with the appalling number of neurotic patients, I do not hesitate to say that the great majority of our failures to give relief in such cases is due almost entirely to a deficiency, not in theoretical knowledge of medical literature, but in alertness or practical insight in our clinical observations. How often do we find the physician face to face with one of these neurotics say, for example, a mild case of manic de-

pressive psychosis, with a cycle of symptoms—periods of mental stimulation and depression, accompanied with other neurotic disturbances, polyglandular involvement, a low blood pressure and deficient metabolism! He is dreaming over volumes of medical lore, and is completely at sea. The neurotic disturbance is allowed to progress, and the patient is called a neurasthenic when a practical insight into the clinical conditions—a familiarity with the correlations of the organs and functions of the nervous and glandular systems would solve his problem and save his poor patient from the most distressing state of mental deterioration.

Again, leaving the field of nervous disorders and coming to the specialist, how often is the oculist, after using his impressive examinations and local treatments, not only embarrassed, but perplexed and even helpless in some given case, say, for example, a case of chronic choroiditis, because he cannot find the dominant factor in its etiology among the correlations of some constitutional disorder! Just here I may say that two very interesting cases of choroiditis with exactly this history came under my observation several years ago, and that they were both finally cured by a general practitioner simply by giving careful attention to the underlying factors of some constitutional disturbance.

Now, while the whole medical field of activities abounds with such illustrations, why should I make a plea for more careful and comprehensive study along this line? My answer is because this line of work appears less attractive, more laborious and more tedious than many other lines to the coming generation of physicians. Indeed, to make an able, skilful, clinical diagnostician, requires not only time and patience to acquire a broad scope of medical knowledge, but also the time and experience to assimilate it. Moreover, in this restless age when there is a fascination in exchanging the old, tried methods for almost anything that is new and glittering, when there is a growing tendency among many to avoid intellectual drudgery and to hurry through with their work, to shift responsibility upon others, and to seek an easy seat in the band wagon of the great parade of medical progress, it is well to bear in mind that the so-called commonplace observations of the trained clinician are still indispensable. In closing, I will also add that in the face of all our recent, wonderful scientific discoveries, the

profession at large still needs, above all other things of similar import, a more intimate and comprehensive knowledge of the correlative relations of the structures, functions and, in case of disease, pathological processes of the human body.

DISCUSSION.

DR. M. W. CRAFT, Lee Hall: I would like to ask Dr. Hiden what symptoms preceded the laparotomy which was performed in three cases of hypothyroidism. I have seen hypothyroidism with flaccid muscles, low blood pressure and various symptoms, but I have failed to ever see one have symptoms which would lead me to think of having a laparotomy done, and, judging from his paper, I suspect these were cases already having been done by some other surgeon. If so, possibly he could not state, but if he had taken these cases from a history of the laparotomy, I wonder if they were not done for some other cause than hypothyroidism.

DR. J. H. HIDEN, Pungoteague: I can answer in two of these cases. I do not know about the third case, because it had been operated on before I saw it; it was turned over to me after the operation, and I don't know positively what the symptoms were previous to operation. But I feel sure that the case was suffering with hypothyroidism at the time I saw it, and I was the ninth physician that saw the case professionally. Of course, I do not know what the surgeon had in mind when he performed the laparotomy.

The other two cases referred to were seen by me before they went to the hospital, and they gave the symptoms of thyroid deficiency, as I have described in my paper. In one of these cases the operating surgeon gave me as his reason for operating that the patient had been sent to him by her physician, and that she insisted upon an operation. I suppose he thought that medical efforts were practically exhausted without relief, and that, as the patient desired an operation, he was justified in making an exploratory incision.

The second case had been treated unsuccessfully for a long time and was finally sent to the hospital. The surgeon in charge of the case, unable to make a positive diagnosis, did an exploratory laparotomy, pronounced it a case of neurasthenia, and sent her home. He was a good surgeon, too, but I can't say that he did any wonderful work on that occasion.

PRENATAL CARE AND TREATMENT.*

By ROBERT P. KELLY, M. D., Lynchburg, Va.

This is a subject on which much has been written, but its importance justifies any emphasis it may be given. There has been much discussion of the causes of maternal and infant mortality in obstetrics, and many methods of obtaining better results and of improving present records have been suggested by various authorities. As an obstetrician, it has fallen to my lot, of course, to deliver many women who have previously been delivered by other physicians. From discussions with these

patients and from observation, I have reached the conclusion that the most neglected stage of pregnancy or labor is the ante-natal period, and it is my opinion that herein lies the chief opportunity of reducing maternal and infant mortality.

To the accomplishment of this end three things are essential:

(1). We must educate the *physician* to a proper realization of the importance of pre-natal care.

(2). We must educate the *pregnant woman* to see medical advice early.

(3). We must find some way by which we can reach the newly married women of the country with literature which will make them realize the importance of seeking this ante-natal care in the early months of pregnancy.

As to the first of these points, I feel sure that practically all physicians are capable of doing what is required in ante-natal treatment. For them all that is necessary is a keen realization of the importance of their work, of the serious consequences arising from its neglect, and of the excellent results obtainable through its proper execution.

On account of our failure to apply properly our knowledge in this field, I believe we are responsible for a large percentage of the infant and maternal mortality and morbidity, half of which, as well as half of the gynecological operations, may be traced to complications or causes which could have been relieved or prevented by proper prenatal care and treatment combined with skillful attention during labor and delivery. Assuming that this is true, is it not time that we were doing something to correct the fault and to prevent this loss of so many young mothers and babies? It is sad to see anyone die, but what else can so deeply stir our sympathy as the death of a mother in her effort to produce a living child?

Let us make a few inquiries into our methods of treating these cases. How many of us are doing our complete duty; how many of us would be satisfied to have our own wives receive the same prenatal treatment as we are giving to the wives of other men; how many of us pay any especial attention to this stage of a confinement case; how many are satisfied with a single examination of the urine, or even fail altogether to examine it; how many take the blood pressure regularly, if at all; how many take any notice of diet, exercise,

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environment, family history and personal history, not to mention numerous other points of equal importance; how many ever listen for the fetal heart before or during delivery; how many make a diagnosis of position and presentation before or after labor begins; how many make a complete physical examination of the patient, as to pelvic measurements and the like? All these details and others are essentials of proper prenatal care and treatment. Unless we do these things, or most of them, whether we are specializing in the city or doing general work in the country, we are not doing our duty to our patients, and we are, at best, little better than many midwives. There is not a general practitioner among us who is not capable of giving his patients all necessary prenatal care, and if he is not willing to do so, he should not assume the dual responsibility of a confinement case. By properly carrying out this treatment, he will not only fulfill the better his duties as a physician and save himself much embarrassment, but he will thereby save the lives of many mothers and babies, and have the satisfaction of knowing he has been true to his patients and to his profession.

If I may indulge in a personal reference, I should like to cite a bit of my experience in this field. Throughout my fifteen years of practice I have been deeply interested in obstetrics and have always watched these cases very carefully. As a result, I have never had in my own practice a case of convulsions, the only such cases coming to me being those referred, or seen in consultation. Of course, I have had cases of toxemia, but—doubtless by good fortune—I have always been able to do one of two things: To get the mother through pregnancy by appropriate treatment, or, failing in this, to deliver her prematurely without convulsions, probably thereby saving her life.

If one should ask me what I consider the most important stage of pregnancy or labor, my reply would be the prenatal period; and for my patients, as a rule, if I should advise them to take only one of the three—prenatal care, attention during labor and delivery, or thorough post-partum care—I would select prenatal care. Of course, I do not mean to minimize the importance of a proper delivery nor of first-class post-partum care, but I do believe that more can be done, in the majority

of cases, toward saving the lives of mothers and babies, by efficient ante-natal care and treatment than by any other means. In fact, there will be less need for interference during labor and delivery, and the post-partum period will present fewer complications, if we give to these patients the prenatal treatment they should have.

I wish to outline briefly what I consider some of the most important points in this treatment:

(1). A careful general physical examination, including heart, teeth and tonsils.

(2). A careful special examination, including measurements of the pelvis, diagnosis of position and presentation, condition of soft parts, position of uterus, etc.

(3). Past history, including family history, miscarriages and their cause, gonorrhoea, syphilis, nephritis, childhood diseases, past labors, if any, etc.

(4). Wasserman test, *at least* in suspicious cases.

(5). Regular urine examinations. At first every three weeks, then every two weeks, or oftener the last month.

(6). Blood pressure readings regularly, as in the case of the urine.

(7). Diet when necessary. To this point we are inclined to pay too little attention.

(8). General health rules, exercise, fresh air, sleep, no worry, condition of bowels, home conditions, etc.

(9). Give patient a list of instructions. Tell her to notify her physician when any of the following symptoms appear: Severe headache, edema, visual disturbances, vomiting in excess, retention of urine, bleeding, however slight, unusual pains in the abdomen, or any symptoms she cannot readily explain.

(10). Limit sexual intercourse, total abstinence the last month, possibly also the first few months.

(11). Pay particular attention to breasts, deformed nipples, etc.

(12). Do not allow patient to go long beyond term. Make careful examinations to determine this. Many babies die from this cause.

(13). Advocate the establishment of prenatal clinics, where the poor may go for examination and advice. We have such a clinic in Lynchburg, and I have the honor of conducting it. The greatest difficulty we encounter, in a large percentage of cases, is to

induce these patients to consult us early in pregnancy. If they do not come to us until near the end of pregnancy, of course we cannot give them the treatment they need. This lack of self-interest on their part is apparently due largely to ignorance and partly to embarrassment, both of which could be overcome, if we had some way to reach them and make them understand the importance of seeking medical aid early in pregnancy.

The question presents itself, therefore, as to how we are to reach these patients in a proper ethical way with literature which will teach them to realize the importance of seeking early this prenatal care. After careful deliberation, I have deduced a plan which I should like to present to this Society for consideration. I hope it may win your approval and co-operation to such an extent that definite steps may be taken at this meeting or in the near future toward perfecting it and putting it into operation.

I would suggest the enactment of a law requiring that the name and address of every newly married couple in Virginia be forwarded promptly to the State Health Department by the official issuing the marriage license, and that properly prepared literature on the subject of pregnancy and prenatal treatment be forwarded by the Health Department to each couple within sixty days after marriage. I think it would be well also to include in such literature information on sex relations, the injurious effect of interference with normal sexual intercourse, its bearings on sterility, and many other things of more or less importance, of which, as a rule, nine-tenths of the newly married couples are completely ignorant until too late. Special attention should be called to the importance of consulting a physician as soon as pregnancy is fairly certain or even suspected. If such a plan as this could be developed in Virginia and throughout the country, it would not be long before we would have a well informed public. Our cases would come in earlier and, as a result, many lives would be saved.

As a brief summary of my opinions on this subject, I would say:

(1). We are not doing our duty to our patients, to our country or to ourselves, if we fail to give the expectant mothers every possible attention during pregnancy.

(2). There is scarcely a physician in the

state who is not capable of making these simple investigations, which are so important, as there is no other way of learning the condition of the pregnant woman.

(3). By giving the proper prenatal care and treatment, we can reduce, practically to zero, the deaths from convulsion, which now claim many.

(4). Through our medical journals, textbooks and colleges, we can bring physicians to a realization of the importance of this work, and through the State Department of Health we can educate expectant mothers.

(5). When possible, a specialist should be called in consultation on every complicated prenatal condition and on every difficult or complicated labor case.

705 Church Street.

DISCUSSION.

DR. W. A. PLECKER, Richmond: This is an extremely interesting and instructive paper. This is a subject that has engaged my attention since I have been State Registrar. I took up that work as an old obstetrician, and one of the things that has grieved us most in our office is the large number of absolutely preventable deaths from childbirth that come in to us. If we take these statistics and study them, we can see the evidence of neglect all the way through.

We have been trying to work out a method in the office to overcome this, as far as it is in our power. In order to do this, we have had the legislature place under the supervision of the State Registrar all the midwives of the State, and we have tried to give them some instruction as to prenatal care, as far as it is possible to teach these ignorant creatures. We have forbidden these midwives to make vaginal examinations under any circumstances. If we can succeed in enforcing that regulation, we can save, each year, fifty to seventy-five deaths of mothers from septicaemia.

We have been trying to carry out a little educational work. We have a little booklet which we call "The New Family," which we send out to newly married women, which touches a little on this subject. We are treading on new ground and a delicate subject, and we are wondering how far we can go with this method. That has been so gratefully received by hundreds of the most intelligent women to whom we sent it, and so many inquired for further prenatal literature, that we have something more comprehensive just from the press. This purports to deal with the nutrition of the new family; we call it "Feeding the New Family," and it emphasizes particularly prenatal feeding of the mother, in the interest both of mother and child.

As to giving some of the advice mentioned in this paper, I would be rather afraid to risk it, because there is a little danger of offending some of these people when they have not asked for information. As to just what sort of prenatal talk we are trying to get over; of course, what we try to impress on these women is the fact that they must stay away from the midwives, and they must go to the best doctor they can, and then we urge upon them to place themselves under the care of a physician as soon as they discover that they are pregnant. We

suggest that regular examinations of urine be made, but we don't tell her her blood pressure should be taken and that those other things should be done, because she might have a doctor who does not do these things.

DR. KELLY, closing: I fear that Dr. Plecker misunderstood my idea. I did not mean to convey the idea that the patient was to be given all the information contained in this paper. The thing I wish to emphasize is the importance of having the pregnant woman educated to the necessity of going to a physician early in pregnancy. I did not mean to include in these instructions to be sent these women anything that would tend to treat or induce these cases to treat themselves at home; far from it, but only such information as would persuade them to seek medical attention early.

CANCER, THE TRIBULUS TERRESTRIS OF DISEASES.*

By STEPHEN HARNSBERGER, M. D., Warrenton, Virginia.

A NUCLEUS OF TRUTH. The West and Southwest grow a weed known as *Tribulus Terrestris*, or puncture vine, possibly a creptogamous plant, which, devoid of flowers, reproduces by minute one-celled spores. But this is of less importance than the truths we wish to impress by mentioning this accursed immigrant from Southern Europe. In its relation to the automobilist it is the very accurate counterpart of cancer to man. This vine or weed, if you prefer, lacks attraction, is innocent looking, and presents no appearance of danger, but when it is irritated by the impact of the wheels of the automobile driven against it, it punctures at once and forever destroys the life of the tire.

DELUSIVE SECURITY. So it is with the innocent looking skin blemishes which most people let pass as of no further concern than that they exist. Notably the little hard scale about the face, lips, ears, eyelids or bordering the mucocutaneous surfaces or elsewhere; also the little painless knots, lumps, moles, warts, nevi, and the irregular nodules or any other blemishes perceptibly raised above the skin, especially that common incrustation called *keratosis senilis*. While ulcerative changes in these skin defects multiply rapidly after middle age, *malignancy does appear at much younger ages*. Do not let your eyes wake to weep.

MINDFUL AND FAITHFUL. In recent years I have removed warts and other defects from quite young children, one not over thirty months, advisedly, to prevent their fingering them. Plus the benefits of ablation, parents

are relieved of the associated anxiety and I feel I have filled a just obligation.

I cannot estimate the large number of adults who have rid themselves of like skin faults through my advice; and without exception they were made happier because their minds were put at rest.

CONSIDER THE END. If these local trophic imperfections are removed early, the person is absolutely barred against future danger from that source. If left to later life, especially until the lymph nodes are invaded, the limit of sure exemption has passed, the human *tribulus terrestris* puncture is as certain as death is inevitable.

"They would none of my counsel . . . therefore shall they eat of the fruit of their own way."
—Prov. 1:30.

IN ANY CASE, A CASE OF CONSCIENCE. The majority of people are ignorant of the mischievous meaning of these skin faults, as well as of the comprehensive means of providing for health in general; and all are more or less careless and inclined to drift along the unwitting way that induces malignance and the lesser ailments. They should be made to know and to realize that they hold a sacred personal part in making and keeping health.

"Through dreary wastes we wandering go, and weep each others woe."

DARE TO BE WISE. Surely it is a good thing to live and a natural thing to die. Then why should people put off doing that which prolongs the thing they desire and hastens the thing they want deferred,—it is a paradox that bars solution. But that's not our business as physicians, we are here for an ulterior and more merciful purpose, to lessen suffering and save lives. Hence, this is an appeal to interest, an argument to the judgment, that is, an argument deriving its force from the situation of the person intended, founded on his ignorance of facts.

Pertinent advice, "It is well to profit by the madness of others."

NOT MERELY FOR OURSELVES. While this paper discloses an appeal to physicians to "get busy," it is designed to urge the people to take an intelligent view of the matter as it exists and to join us in our anxious effort to safe-guard them against that terrible, yet preventable *tribulus terrestris* burden of suffering and death. *It is for them and their children*. Shall it be tears of joy or wails of grief? *It is just as they make it*.

*Read by title at the fifty-third annual meeting of the Medical Society of Virginia in Norfolk, October 31-November 3, 1922.

THE STRONGER REASON. The late world struggle for the freedom of the nations was unavoidable but the havoc assembling by the steady increase of cancer can and should be met and met promptly. To the United States Public Health Service is due the major part in skyrocketing the preventient and persistent preventive knowledge that today is swiping the world of the waste of diseases. Its sustained intelligent aim and endeavor should have the force of the willing and grateful co-operation of the people whose welfare it has at heart. Don't be a moppet or a musang-coffee rat.

TEAM WORK COUNTS. Physicians are the duly authorized actors in the play of naturalizing prophylactic practices to the common good; all welfare workers are co-equal and essential factors in the canvass to establish habitual usage and insure lasting maximum results. Keep step with us! Fix in mind this statistical fact. In New York City last year the increase of the death rate from cancer was greater than from tuberculosis. Looking at it in this convincing way, how will it be with your children and grandchildren when they reach your age? If we fail in our duty now their suffering and deaths will be upon our heads.

NOT TO BE FORGOTTEN. It is a one-sided question but it is all on the side of conation; in other words of desire and will or volition. Get the idea? Save your children.

Read what Shakespeare tells you:

"This our life, exempt from public haunt,
Finds tongues in trees, books in running brooks,
Sermons in stones, and good in everything"—
except DELAY.

OBSTETRICS A NEGLECTED SCIENCE AND ART.*

By GEORGE THOMAS MYERS, M. D., Norfolk, Va.

I shall preface my remarks with a brief apology in stating that I read a paper by this title before the Norfolk Medical Society, November 24, 1913, but as we have had quite a number of innovations in obstetrics within the past ten years, and all innovations are not progress, I am of the opinion the title is apropos at this time.

Obstetrics is a scientific art and mechanical skill that should be given to woman during pregnancy, at the confinement, and through the puerperium. The scientific art can be learned

only from a correct understanding of the obstetrical pelvis, the female organs of reproduction and the female generative organs, the physiology and pathology of normal and abnormal diseases in the female. If normal conditions are understood, abnormal ones will be recognized and appreciated in pregnancy, at the confinement and through the post-partum period. The mechanical skill can only be learned at the bedside and then only by painstaking attention to every detail in eliciting the presentation, position, location of the foetal heart sounds, a correct appreciation of the diameters of the pelvis, and every other method in vogue that is used to make a correct diagnosis of the particular case; and close attention during the delivery. This can be accomplished in only one way, and that is by competent instruction from one who has had special training and practical experience in this science. To succeed in any science one has to master the elements; the foundation well laid, attainment of knowledge will surely follow. The obstetrical teaching in the past in our medical schools has been neglected; the article of Dr. J. W. Williams of Johns Hopkins University that was published in the *Journal A. M. A.*, in 1912 in reference to the qualifications of professors of obstetrics in our medical schools was astounding. I think this paper has proved beneficial and encouraged better teaching of obstetrics in our medical schools during the past decade. A few years ago men graduated from our universities and medical schools and were licensed by our state examining boards, allowed to practice obstetrics upon an innocent community, who had actually never seen a case of labor, much less assisting in one. The condition is bad at this time, and there is a large field for better clinical teaching of obstetrics; the science of obstetrics has been looked upon as a minor subject, and the child-bearing woman in general has reaped the benefits thereof.

The profession of today underestimates the importance of the subject, and countless infants are sacrificed or made cripples and mentally defective for life, the mother shares the fate of invalidism for life, purely from ignorance on the part of the attendant at this eventful time. This is speaking conscientiously and frankly; it is high time that the profession were awakening to this important branch of medicine.

Obstetrics of all the branches of medicine should be specialized. The obstetrician should

*Read at the fifty-third annual meeting of the Medical Society of Virginia in Norfolk, October 31—November 3, 1922.

be a man well versed in gynaecology, pediatrics, therapeutics, physiology, pathology, and, above all, he should be sound in his judgment, conscientious in his work, and capable. He should be able to perform any abdominal operation, thereby being in a position to cope with any complication that may arise in this particular line of work; capable of performing cesarean section, abdominal section for ruptured uterus and ruptured ectopic pregnancy. These complications do occur and, in the event of such, the obstetrician should be master of the situation, thereby giving to his patient that skill and attention she should receive and demand from him. The general surgeon is not as conversant with the various obstetrical operations as the obstetrician should be. A skilled surgeon is not necessarily a competent obstetrician, due to the fact that obstetrical operations are far different from other surgical conditions; that is to state, such as the application of forceps, performing version, podalic or cephalic, manual dilatation of the cervix, and in exercising the proper judgment and skill in dealing with a case of placenta praevia; face presentations, occiput posterior, transverse presentations, and many other complications that the obstetrician has to meet with in this branch of medicine; requiring the utmost skill and judgment from a ripened experience in this particular surgical obstetrical technique. I have seen thoroughly competent surgeons who did not know how to apply forceps correctly, namely; making a pelvic application in all forceps operations, or performing version without doing considerable damage to the mother and the child. Therefore, the various obstetrical operations and complications should be dealt with by the obstetrician and not by the general surgeon.

The application of forceps is a dangerous procedure in the hands of the inexperienced. The correct application of forceps requires a good deal of skill, and in many instances is a more serious operation than an appendectomy. Every graduate of medicine, if the occasion arises in his obstetrical work to apply forceps, will attempt to do so without even having had practical experience, although he will send his appendicitis cases to the surgeon. This is due to the fact that the importance and danger of obstetrical operations has not been taught the general practitioner, and the laity have not been educated to expect any more skill from one physician than another in the science of obstetrics. If the case terminates either in

the death of the child or its mother (and in many cases both are sacrificed), the practitioner is exonerated from any blame, as it was the will of Providence and not his ignorance.

The vast majority of gynaecological cases that are met with are due to mismanagement or avoidable accidents of the pregnant and parturient state. This large class of invalids who owe their condition to careless, incompetent and unclean obstetrics can be reduced, if not practically prevented: the remedy is to be found not in the preaching, but in the practice of skilful, clean and conservative obstetrics. The old adage is apropos here: "An ounce of prevention is worth a pound of cure." De Lee in his text-book asks the question: "Is labor in the woman of today a normal function?" I feel confident he answers the question satisfactorily to us all, namely: "I say it should be, but is not."

With all the attendant zeal of modern obstetrical asepsis and antiseptics within the past twenty-five years, the deaths from child-birth in the United States are appalling, twenty to twenty-three thousand women dying annually. The percentage of still-births is entirely too high. We have had campaigns inaugurated to fight against tuberculosis, cancer, malaria, typhoid-fever, pellagra, hookworm disease and many other ills that the human frame is heir to, but I have yet to hear of one inaugurated for the betterment of obstetrical practice. The science and art of obstetrics has dragged along for centuries, and it has not reached the elevated place it deserves in medicine. The day is not far distant when the profession, as well as the laity, will awaken to the importance of the subject and demand better obstetrical skill and attention. Of all the branches of medicine obstetrical work is the most arduous, nerve racking, and the least remunerative from a financial point of view. But as to the accomplishment of actual results of scientific work, and the relief of pain, it outshines the other branches of medicine. No where is the conscientious physician put more to the test than in a complicated labor, if he has the interest of his patient and her offspring at heart; and I say frankly that in no other branch of our noble calling can as much harm, suffering and actual sorrow be brought to those most vitally concerned, than in the hours of promised motherhood.

Pelvimetry by the general practitioner is tabooed as being fallacious, but it is of the

utmost importance to have correct measurements of the pelvis in all primigravida, and in every case that gives a history of preceding difficult labors. If pelvimetry is practiced, the various contractions of the pelvis, exostosis, tumors and ectopic pregnancy are discovered. This enables the obstetrician to treat the case scientifically, not waiting until the patient has advanced in labor, with much suffering, before the true condition is elicited, when possibly it is too late to give the patient the benefits of the induction of premature labor or cesarean section. It can readily be seen and appreciated that pelvimetry is of the utmost importance and benefit. Pelvimetry in relation to the foetal head has not been perfected, although it is of some importance. When pelvimetry is adopted as a routine by the profession, craniotomy will only be occasionally performed, as this operation is unscientific and barbaric and should be relegated to the past as history of obstetrics. When we have awakened to the importance of details of pre-natal care in our patients, this operation will only be performed on the dead child.

It would be preposterous to apply forceps in a delayed labor due to a narrow conjugate. The obstetrical forceps is one of the greatest inventions in the obstetrician's armamentarium, and the one mostly abused. The name of Chamberlen should have gone down to posterity as one of the greatest benefactors to womankind; if the greed of filthy lucre had not been predominant in his makeup, his name in obstetrics would have been immortalized as is that of our illustrious father of gynaecology, J. Marion Sims, is by the speculum. The indications and contra-indications for the interference of labor by forceps I will not discuss, but it is well to bear in mind their usage is to extract a living foetus from the pelvis without injury to itself or the maternal soft parts. My own rule to to apply forceps in the second stage of labor if there is no advance in the head after two hours of full dilatation, the pains becoming less frequent and lacking in expulsive power. As a routine, the application of floating forceps should be condemned, and internal podalic version or cesarean section elected as the operation indicated. As to the interruption of labor before the completion of the first stage, I am of the opinion there can be no fixed rule; the individual case and experience of the obstetrician will be the deciding factors as to what method to pursue. The

innovation by Potter in performing internal podalic version in every normal labor that is progressing satisfactorily, is unscientific, and will never become a routine procedure. With this panacea for the amelioration of pain and shortening of the second stage of labor, Potter performed one cesarean section out of every eleven cases admitted to his clinic last year. I have seen his work and I am still of the opinion that where version is indicated, forceps are contra-indicated, and *vice-versa*. Bear in mind one important operative technique in all forceps operations; the uterus should be fully dilated, membranes ruptured, bladder and rectum empty, the vulva shaved, the blades applied in relation to the position of the foetal head, the patient on a table, and under complete anaesthesia. In some cases it is preferable to deliver with the blades in position; in other cases to remove the blades when you can control the head at the vaginal outlet.

Placenta previa should be dealt with early as delay is dangerous. The treatment will depend upon the period of gestation and the stage of labor. If dilatation is sufficient to admit the performance of internal podalic version in the lateral and marginal varieties, this is the operation of election; if there is not sufficient dilatation, rupture of the membranes, sterile gauze tampons, Champetier de Ribes, or Voorhees bags may be used. In the central variety with hospital facilities, cesarean section, either the classical or Krönig's operation, is the obstetrical course to pursue. Accouchement forcé as a treatment of placenta previa should be condemned.

In speaking briefly relative to the treatment of eclampsia, and severe toxemias, the exact etiological factors are still in debate, with one exception: that they are the result of an impregnated uterus. In consideration of this fact, I feel that the best obstetrical course to pursue in these complications is an early emptying of the uterus. The method adopted will depend upon the stage of gestation, stage of labor, and whether the case is a primipara or multipara. In a primipara, with an elongated rigid cervix, cesarean section is the operation of election. Stroganoff's method has not proved satisfactory to me.

Puerperal sepsis is a preventable disease and is too frequently encountered in this enlightened age of asepsis and antisepsis. If we do not forget the clarion note of Oliver Wendell Holmes, the magnificent work and ap-

peals of Semmelweiss, and if in all obstetrical manipulations, cleanliness is our rule and guide, this disease will rarely be encountered.

Another innovation we have had is twilight sleep. The original technique as promulgated by Krönig at Freiburg has justly died a natural death; it was "weighed in the balance, and found wanting."

The innovation of bagging all cases that are presumably overdue is not sound obstetrical judgment, as there are numerous factors to be taken into consideration before arriving at such a conclusion.

The use of pituitrin during the first and second stages of labor is an innovation that is dangerous: the physiological action of the drug will ultimately result in serious complications to the advocates of this method. During the past decade experimental research has thrown much light on the physiological and pathological problems to be met with after the use of pituitrin, leaving out of consideration any speculative hypothesis. I have endeavored, in the time allotted to each paper before this section, to give you the salient points in this science and art. In conclusion, always bear in mind that the very outcast of the streets should receive the best attention, judgment, and skill from the obstetrician, in the hours of promised motherhood, remembering this motto: "*Non nobis solum.*"

624 Armistead Bridge Road.

DISCUSSION.

DR. M. P. RUCKER, Richmond: Dr. Myers has given us a good deal to think about. His opinion that our medical schools and colleges do not educate the student thoroughly in obstetrics is correct. In Richmond, in 1920, there was one maternal death in every eighty-eight cases. Of course, this is exaggerated, because some are abortions, but it is sufficient to show that there is a tremendous mortality.

When you stop to think, you can very readily see the reason for this condition. The medical student is taught obstetrics on the banks of Shockoe Creek, instead of in an up-to-date hospital, and therefore he gets a poor idea of the technique with which he goes out of school.

It is a well known fact that you very seldom do better than the ideals with which you start out. You usually drop a little below those ideals. If you carry from school a below-standard technique, you are not very likely to rise above it.

We have to do one of two things. We have to educate the people that an M. D. degree does not mean a master obstetrician, or we have to provide means for our schools to give their students all the facilities of studying obstetrics that a modern hospital has. I do not see anything else to do. You have got to have a post-graduate course in obstetrics, or else improved facilities for teaching obstetrics properly in the regular course.

DR. J. BOLLING JONES, Petersburg: I greatly enjoyed Dr. Myer's paper. To my mind this is one of the biggest subjects that we have to think about

today. Obstetrics pertains not so much to the mortality, but to the morbidity. I am sorry to say that the average doctor thinks everything is all right if the baby is born, without giving any regard to the poor woman's condition.

I think that no obstetrician can be absolutely competent unless he has a thorough knowledge of gynecology. I believe that if all medical students were thoroughly educated in obstetrics, and the patients could be taught to see the subject in the true sense, the question of the midwife would be settled. There is just one other point that I want to speak of, and that is that too many surgeons cut in any old place without any regard to the pelvimetry.

DR. G. B. BYRD, Norfolk: I want to emphasize one or two of the points that Dr. Myers made. The first is the examination of the woman during the pregnancy and before the labor. I think that these examinations should be made as early in the pregnancy as possible. As to the method of pelvimetry to be used, use all at hand.

After the baby is delivered and the placenta delivered, I carefully examine the patient for any involvements. A great many men tell me that they have done a great deal of obstetrics and have never had any lacerations. A great many of mine have to have sutures. Examination should always be made just as thoroughly after delivery as before. When the patient is shocked and you are unable to do anything at the time, you should have the patient report back to you at some later time for a thorough examination. In treating a patient I do not believe that you have given all of the service you could if you do not ask her to report back to you for examination after the baby is born and after she is up. I am sure that if the men who boast that they have never had any lacerations had had the patient report back after about eight or ten weeks, they would find some little involvement.

DR. A. W. GRAVES, Lacey Spring: Obstetrics should be a very easy matter when you have the facilities of a hospital with all modern technique, but when you get back in the rural section, where the patients call you in at the very last minute, what are you going to do? It is too late, without secondary operation, to do anything. The only thing I see to do is to educate the expectant mother and the anxious father. Most of the complications are due to too much neglect afterwards by the mother. Where you have a case in a rural district, most likely someone has advised her not to go for examination and incur unnecessary expense. After the trouble it is too late to accomplish much. The fetal mortality in our section is very small where you have seen the mother beforehand and several times afterwards. After they get up they do not want to see you, as they think you want to get the extra fees. They do not realize the importance of coming for a urinalysis. Some people will take the good advice of other people and come to consult an obstetrician, but on the other hand, others will not call on you until their confinement. I feel what should be done is for all physicians to notify the health authorities of the expectant mothers in their districts or localities and have them sent letters or literature which would be of benefit to all newly married couples or expectant mothers.

In regard to the after treatment, one important point is the treatment of umbilical hernia, "tongue tie." Some cases can be cured, if you get them early enough; if they are neglected six or seven years, they of course come under surgical procedure: e. g., umbilical hernia.

If a physician knows of any women in his community who are going to be confined, whether cases of his or not, that physician should notify the health

authorities, and at all times co-operate in that capacity and treat all correspondence as confidential. Be ready or willing to aid in the one great purpose which we are in honor bound to fulfill and to assist new born babies to health, which should be under modern conditions.

Again I find so many mothers who have been "badly treated" by some one at first delivery. Why should some of our profession be so negligent at the most important moment of a woman's life, for health and liberty should be pre-eminent and we should not accept such a case if we are going to neglect the most important part of treatment—lacerations. Patients should be properly prepared, and I find the lateral position in bed the most successful for the post-operable conditions, enabling discharges to drain over non-lacerated tissues, thereby causing certainly a better union of lacerated tissues, if you have any.

DR. GEORGE T. MYERS, Norfolk, (closing): This is a serious subject. Dr. Rucker is entirely right, in that students should be given special training in obstetrics, not only in Richmond, but everywhere. The men who attend Cornell and other big universities are required to attend so many labors before they are allowed to practice. As Dr. Rucker says, the science of obstetrics has been sadly neglected by the profession as a whole.

In reference to pelvimetry, of which Dr. Jones spoke: pelvimetry is not accomplished until you use both internal and external pelvimetry. Dr. Byrd, in reference to lacerations: The patients should always be urged to return after six or eight weeks after delivery so that you can look for lacerations and misplacements. Dr. Graves, in reference to country practice: It has been my experience, in going to the country, to find a lack of co-operation among the doctors. The country practitioners cannot get help from each other. Obstetrics can be done as well in the country as in the city, and hospital facilities are not absolutely necessary. If you have competent assistance, there is almost no danger in performing the various obstetrical operations, namely: forceps and version and, if absolutely necessary, the cesarean operation can be performed in the country districts.

LATENT MAXILLARY SINUSITIS.*

By J. WARREN WHITE, A. B., M. D., Norfolk, Va.

The anatomy of the maxillary sinus will be described briefly so as to show how easily an infection may be latent for years and produce no local symptoms.

The maxillary sinus is a pyramidal shaped cavity hollowed out of the superior maxillary bone. The floor may be on a level with the floor of the nasal cavity or it may be at a considerably lower level. The floor of the cavity is by no means smooth and regular, and quite frequently it is divided by bony septa into pockets. Frequently, roots of the bicuspid and molar teeth project into the cavity. The walls of the cavity vary considerably in thickness. The mucous membrane is continuous with that lining the nasal cavity and does not differ materially from it. The maxillary sinus com-

municates with the nasal cavity by a small opening in the middle meatus. Thus we can easily see the difficulty in drainage of an infected maxillary sinus and how easily an infection may become encapsulated in the cavity.

As to the percentage of maxillitis, from dental and nasal infections, there is a wide difference of opinion. It is, however, invariably secondary to either infections of the nasal cavity or infections around the roots of the bicuspid or molar teeth.

The mucous membrane of the cavity usually becomes very much thickened and polypoid-like. Frequently, well formed polypi are found projecting from the mucous membrane. With a thickened mucous membrane, pus can easily become encapsulated on account of the difficulty in drainage through the normal opening in the middle meatus. Chronic infections of the maxillary sinus are far more prevalent than the rhinologist and others have realized. Coffin, of New York, was among the first in this country to do any original work along this line and brought to the attention of the medical profession the frequency of sinusitis among children and the eye affections associated with it. At one time it was considered more a factor in dental than nasal diseases and then the surgery of this important sinus was turned over to the dentist. The drainage of the sinus through the alveolus was the operation for years, until its utter ineffectiveness was demonstrated and more rational methods were instituted.

Have we done our full duty in adenoid and tonsil cases until we have made a thorough nasal examination for the presence of infected sinuses? The reduction of mortality today is not in the treatment of diseases but in prevention. Thus, a searching investigation should be made for any other undermining factors in each case before removing the tonsils and adenoids. The presence of pus in the maxillary sinus with no tendency to recover spontaneously or by non-operative treatment is an indication for operative interference. In recent years the profession have come to realize the great number of systemic diseases resulting from latent infection. Several cases of tic douloureux have been reported as cured by clearing up a low grade maxillary sinusitis by operative treatment, with satisfactory drainage. The sinus disease, in this case, is more of a chronic infection of the mucous membrane than of a collection of free pus. The connection between maxillary disease and trifacial

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neuralgia is certainly worthy of investigation. The question has arisen, is there any such thing as latent infection? The infection may be latent as to giving no local symptoms at its original source, but is there not going on a continual absorption into the general system from the original point of infection? We all realize the insidiousness of focal infections and the irreparable damage resulting therefrom before the patient even realizes the gravity of his condition. Preventive medicine is the medicine of the future and I am taking up latent maxillary sinusitis as one of the sources of focal infection that is frequently overlooked. As to the determination of the presence of pus in the maxillary sinus, it is very easy at times, but in some cases it is quite difficult. On nasal examination, if we find pus in the middle meatus, it is wiped away and the patient is told to place his head on his knees with the affected side down. This places the ostium in a dependent position and, if any pus appears in the middle meatus, we can feel reasonably sure it comes from the maxillary sinus. Transillumination is of great diagnostic value in some cases. Roentgenography has, however, supplanted all other methods of diagnosis as it is most convincing. A very slight infection will be shown by the X-rays on account of the obstructive character of pus and diseased mucosa. Exploratory puncture is frequently resorted to when all other methods of diagnosis are negative. A painstaking history is very important in these obscure cases in assisting us in a diagnosis.

I will report several interesting cases that have come under my observation. *First*.—Mrs. A., age 35, was referred to me by her dentist, with the following history. After the extraction of several teeth, he found the right maxillary sinus was infected. Drainage through the alveolus continued for several weeks prior to my seeing the patient. The personal history in this case showed that she had had severe headaches for two years, and had sought treatment at various times in an effort to be relieved of these headaches. The source of her trouble, however, was accidentally discovered by her dentist. A Caldwell-Luc operation was done. The opening in the alveolus persisted for several months but eventually closed.

Second.—Miss C., age 38, came to me complaining of a cough and feared tuberculosis of the larynx. Physical and X-ray examination of her chest were negative. I found nothing

on examination except a left bicuspid tooth that looked suspicious to me. She was referred to her dentist for further examination. The report came back that the X-ray picture showed an abscess at the root of the tooth and the root of the tooth extended into the maxillary sinus. The X-ray of the sinuses showed the left maxillary sinus infected. An intranasal opening was made and 15 cc. of pus was aspirated.

Third.—Mrs. G., age 55, came to me with a history of pain in the left side of her face and headaches for ten years. This dated from the time she had a severe spell of typhoid fever. Her eyes gave her a great deal of trouble and looking at a bright light would give her severe headaches. The X-ray plate showed a cloudiness of the left antrum. An intranasal opening was made and 10 cc. of pus was removed. The culture gave a pure growth of staphylococcus aureus. I will only report these cases in an effort to show their obscurity at times and also the importance of being on the lookout for this condition.

In closing, I wish to emphasize the following points which are most convincing. *First*, infections of the maxillary sinuses may be the etiological factor in arthritis and many other diseases; *second*, this infection may produce almost no local symptoms for many years; *third*, this infection works insidiously and irreparable damage may result therefrom; *fourth*, a search for foci of infection is incomplete until a thorough investigation of the sinuses has been made. The finding of other foci should be no excuse for not investigating the sinuses.

526 Monroe Building.

DISCUSSION.

DR. B. R. KENNON, Norfolk: I wish to thank Dr. White for reminding us again of something very important in the question of focal infection.

I am speaking of the other sinuses as well as the maxillary. There is no doubt that there are a great many infections of all the nasal sinuses that go along without any active symptoms to make a diagnosis for us, and it requires a more careful examination than has formerly been given these cases to give them the proper care. I have been in eye and throat work for twenty-three or twenty-four years and, when I first started, years ago, this sinus work was hardly begun. Patients would come to me and complain of having headaches and want their eyes examined. I would examine them thoroughly and, not finding anything the matter, would pass it up. I would let them go out of my office without examining the nose at all. We are not doing the best we know how by our patients if we let them go out of the office without examining the nose. If the case is then still obscure, we should take an X-ray. The X-ray will show where the trouble lies.

The X-ray is the best thing we have in these cases, because so often a transillumination does not show any trouble when the X-ray will do so.

When the X-ray is positive, you look in the nose and find pus, but you can have a diseased membrane where there is no pus.

The most important remark in Dr. White's paper was the examination of children for sinusitis, when they come complaining of respiratory trouble. Those children should be well examined. You have no idea of the number of children that have acute sinus infection. They are very, very important. I think that there has been entirely too much carelessness in the treatment of children.

If Dr. White can just impress on the members of the profession the importance of careful examination of children's noses, he will have done a great deal of good.

DR. A. A. BURKE, Norfolk: I think Dr. White's paper is very timely. It is a plea for thoroughness. In the past we have been prone to overlook these cases. If you have not made mistakes, it is because you have not found anything to make mistakes with. Unless we give a thorough and complete examination, we have failed in our duty. All cases should be gone into thoroughly—not only one case, but all cases. We should examine thoroughly not only the maxillary, but all of the sinuses.

I remember when we had the scare in New York about trachoma. They thought that there had been an enormous increase, but it had not increased, it was only because they were paying more attention to the examination.

Regarding the X-ray and the transillumination, of course the X-ray will give us forms of information that we cannot get through transillumination, but in my hands the transillumination has been of far more value than the X-ray. I believe it to be probably twenty-five per cent more accurate than the X-ray.

DR. H. L. MYERS, Norfolk: If we find the sinuses involved we know that we must do something. There are cases in which you look into the nose and cannot find anything amiss; even if you have looked well you are liable to say that there are no signs of infection. But that is not far enough. We know that we have something that is producing infection. Every single means of which we know should be used. Transillumination, inspection, radiographs, etc., should be used not only once but often.

Another important thing is getting the patient at the right time. Sometimes between my office and the office of the X-ray man the patient will blow his nose and all evidences of disease will be removed. If we do not have an X-ray several times, we are overlooking part of our duty.

What Dr. White has said of the maxillary is true of all the sinuses. A great number of the headaches that we cannot account for, can easily be accounted for if we look into the nose more often.

DR. J. W. WHITE, Norfolk (closing): The head-mirror I think should be used more frequently. A nasal examination should always be made before removing adenoids and tonsils. In reply to Dr. Kennon as to why I confined my paper to latent infections of the maxillary sinus and did not refer to the other sinuses: The anatomy of the maxillary sinus, as I briefly described in my paper, shows how easily an infection may be latent for years and produce no local symptoms.

ART AS APPLIED TO ANATOMY.*

By JOHN WILKINS BRODNAX, M. D., Richmond, Va.

Associate Professor of Anatomy, Medical College of Virginia.

In considering the application of Art to Anatomy, it is my purpose to confine this paper to two aspects of the subject only; first, to the debt that anatomy owes to art, and, second, the benefit to be derived by artistic methods of observation in the study of anatomy.

To appreciate the debt that anatomy owes to art it is pertinent to give, in brief, the development of artistic illustration in its application to anatomical teaching, and the evidences of anatomical investigation by artists in the period when this science was in its infancy.

Anatomical knowledge of a certain character is as old as art itself, but this primitive knowledge was debased by imperfect observation and blind reverence for the many misleading traditions of the times. Even in these early days art was utilized, and anatomical illustration was employed wherever a semblance of anatomy was taught. Greece, India, and even China, in the remotest periods of their history, resorted to drawings, showing more or less imperfectly the relative positions of the heart, lungs and other large organs, for the purpose of demonstration. These crude efforts, however, need only to be mentioned, for it is not to the flimsy imitation of visceral anatomy that one must look for examples of art, but rather to these masterly drawings of a later date, that display in the highest degree two of the qualities upon which scientific progress depends, accurate observation, and a true record of the thing observed.

The history of art and that of anatomy are by no means contemporary. When art had reached a high stage of perfection, and the sculptor was producing those wonderful masterpieces, known to us as the antique, which are today the admiration of the world for their beauty of contour and faithfulness to nature, medicine was vague and obscure, and in the hands of charlatans, while anatomy, the basis of all medical science, was, for even a mind like that of Hippocrates, a collection of crude and imperfectly noted facts modified by the time-honored fictions of the day. During this dark era of medical knowledge, it was the artist alone who found light to study the anatomy of man. More than a century before the

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school of Alexandria had, under the Greek anatomists Herophilus and Erasistratus, inaugurated for the first time, the study of human anatomy by dissection of dead subjects, and it is said, even of living men, Phideas, the great sculptor of the age of Pericles (450 B. C.), and a contemporary of Hippocrates himself, had acquired such perfect knowledge of surface anatomy that his works appear to us now as the very acme of truth and beauty in the representation of the human form. His noble figures of the Theseus and of the Ilyssus of the Parthenon, the most familiar of his works, might be submitted to the scrutiny of the critical eye of the most finished anatomist or artist of this day, and I would venture to say that neither could discover an error in science or point out a line or contour which could be changed without detracting from the beauty and symmetry of the whole.

At the time these works of art were produced, the dissection of the human body had not yet been attempted; the respect in which the dead body was held was such that the physicians themselves, who should have been able to justify their motives for this study, had never as yet dissected a human body. Hippocrates had dissected animals, and had arrived at certain conclusions by the analogy that exists between the organs of lower animals and those of man. Galen himself dissected monkeys only, seeking to confine his examination to animals whose anatomical construction might be considered as most closely resembling that of man. Galen never possessed a human skeleton, for in a passage in his anatomical works he states the pleasure in studying at last some human bones that had been deposited in a marshy place by a river which had overflowed its banks. When we reflect that Phideas had not the advantages of the study of anatomy by the practice of dissection as did Michel Angelo, but acquired his knowledge of the subject solely through the constant observation of athletes in action during games and military exercises his achievements appear all the more wonderful.

The establishment of the school of Alexandria, less than a century after the death of Phideas, should have done much to advance the knowledge of anatomy, as it is known that under Erasistratus and Herophilus the dissection of the dead body was practiced openly, but there was strangely little harvest from such a broad and fertile field, and the cultivation of

original observation in human anatomy rapidly declined, until in the second century of our era, when Galen, strongly imbued with the spirit of research, by his investigations, was able to give to the world a series of writings which placed anatomy among the sciences, and furnished the profession of medicine with descriptions, so far as they went, not materially different from those contained in the text books of the present day.

Following the fall of the Roman Empire, we come to that darkest of all periods—the middle ages—when art was at its lowest ebb, when learning represented chiefly by Moslems and Arabs and a bigoted clergy was opposed alike to scientific investigation and artistic culture. During all this time anatomy remained at a standstill and little advancement was made in any of the departments of medicine. It was not until the thirteenth century that Frederick II., Emperor of Germany, and King of the Two Sicilies, revived the study of anatomy by dissection, by passing a law prohibiting the practice of medicine without the practitioners having first studied the anatomy of the human body. In spite of two papal excommunications hurled against him, dissections were from that time on regularly pursued in Italy. The first outcome of the new departure was the publication in 1316 of the first treatise on human anatomy, that of Mundini de Luze of Bologna, containing descriptions made from studies of the dead body.

Dissection was introduced into France at Montpellier in 1376, and it is to a French surgeon and artist, Henry de Mondeville who lived at the beginning of the fourteenth century, that credit belongs for having first made use in Europe of anatomical drawings as a means of instruction. The first really important application of art to medicine, however, belongs to a period no earlier than the fifteenth century, at which time artists rivalled physicians in the ardor with which they pursued their anatomical studies, and it may be said that all the painters and sculptors of that period gave the most careful attention to dissection, or at least studied demonstrations made upon the dead body, for all have left amongst their drawings anatomical studies that give evidence of that fact.

To this period belongs one of the most versatile geniuses in history, Leonardo da Vinci, painter, sculptor, scientist, poet, and musician. It was he who, first amongst the artists,

deemed it profitable to cultivate the friendship of representatives of the medical science. It is known that he became intimately associated with the physician, Marcantonio della Torre, of Ferrara and Padua, and that he made for him many drawings to illustrate an anatomical treatise, but the untimely death of Marcantonio in 1506 severed a connection which under more fortunate circumstances might have raised the anatomist to the eminence afterwards occupied by Vesalius. As it was, the great work remained unfinished, all that had been written was lost, and along with it disappeared the drawings of da Vinci. Only a few of the numerous anatomical studies made by this great artist still exist, but the skill



The Nike of Paionios (Circa 420 B. C.).

and anatomical exactness displayed in these bear witness of the care and attention he gave to the study of anatomy. Leonardo himself was the author of a "Treatise on Painting," in which he devotes numerous chapters to the description of the muscles of the body, the joints, and, in his words, the "Cords and small tendons which meet together when the muscles contract to produce action," etc. In this book, he makes allusion at different times to a "Treatise on Anatomy," which he intended to publish, and for which he had gathered together numerous notes.

The period of Leonardo and of the succeeding generation was a glorious one in the history of art, for while the great Tuscan was still in his prime, there appeared upon the

horizon another many sided genius in the person of Michel Angelo Buonarroti, at once painter, sculptor, architect, engineer, and poet. The latter had just reached the zenith of his fame, when Leonardo, full of years and honors, died in the arms of the monarch whose graceful tribute to his genius did more to perpetuate the memory of King Francis I. than any other act of his long and stormy reign.

Michel Angelo, like his predecessor, was not long in seeing the advantages to be derived by associating art with anatomy. He attached himself to Realdo Colombo, one of the foremost anatomists of his day and for twelve years, first in Florence, then in Rome, he devoted himself to the study of anatomy. The results are apparent, possibly too plainly, in all his works. His statues of David, the Captives, and many others, give striking evidence of his profound knowledge of anatomy. Among the large number of drawings which Michel Angelo left to posterity are many beautiful illustrations of dissections made by his own hand.

Another of the great artist-anatomists of this period was Raffaello Santi, better known as Raphael, again painter, sculptor, and architect, who won triumphs as lasting as those which fell to the lot of his illustrious contemporary and rival. Raphael's knowledge of anatomy was not perhaps as deep as either that of Leonardo or Michel Angelo, but it must be remembered that fewer years were allotted for the consummation of his goal, for the grim-reaper claimed him before he had ended the fourth decade of his brilliant career. It is nevertheless shown by his anatomical sketches that he not only appreciated the importance of the science, but that he was well informed on those portions of it which are of most concern to the artist. Among his drawings deserving of special mention as particularly remarkable for its fidelity to nature, is a study of the skeleton intended to give him an exact indication of the direction of the limbs and the position of the joints of the swooning virgin in his picture of the entombment.

To this list may be added the names of Rosso de Rossi and Benvenuto Cellini, both of whom studied anatomy by the practice of dissection, and made many realistic anatomical drawings, some of which are still preserved. Rosso de Rossi holds the distinction of having been the first artist to attempt to prepare a

volume on anatomy for the use of painters; unfortunately, however, he did not live to complete his work. The one plate, showing the bones and muscles, given to the world as an earnest of his good intentions, is, however, so rich in strength and accuracy that it has been mistaken for the work of Michel Angelo himself. Benvenuto Cellini became associated with the eminent Florentine physician Vidus Vidius, whose book on anatomy was not published until long after his death, but it is believed that Cellini greatly assisted him in its preparation.

Up to this time the art of the fifteenth and the first half of the sixteenth centuries bore little relation to medicine, if we leave out of consideration the drawings of Leonardo da Vinci. While great artists left accurate record of all that their dissecting-room experiences had revealed, two of the most distinguished physicians of the age, Magnus Hundt, of Leipzig, and Lorenz Phryesen, of Colmar, for some unaccountable reason, had recourse to the crude

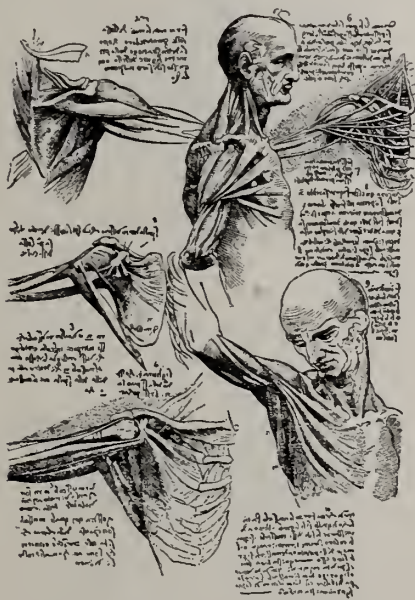
faith to the pedantic utterances of his august teacher.

The second period, that of artistic illustration of anatomical works by wood engravings, began in the first half of the sixteenth century with the appearance of a commentary upon the anatomical work of Modino by Berengario da Carpa (1521). This work was followed in the next year by a compendium by the latter author, in which he corrected many errors of Modino, and added much new material. Both of these books were embellished with woodcuts, a few of which, chiefly myological, displayed much artistic beauty and were fairly accurate, while others were of a traditional character and in keeping with the descriptions of Galen. Berengario himself was artistically gifted and maintained relations with artists and friends of art. It is possible that he received some artistic aid from Benvenuto Cellini, with whom he was on intimate terms, and who was at that time in his early manhood. About twenty years later Johann Eichman, a professor at Marburg, issued an original composition upon the dissection of the human body, with illustrations made by himself, and engraved upon wood by his own hand.

Both Berengario and Eichman accomplished much towards the advancement of anatomical science, and opened the way for a higher school that was destined to consign that of Mondino and his contemporaries to the category of the imperfect sciences. Berengario had half caught the vision of a genuine treatise upon the anatomy of man, based upon facts obtained by actual dissection, but the consummation of such a work was reserved for a far greater mind—that of the immortal Belgian anatomist, Andreas Vesalius.

Vesalius was born in Brussels in 1513. At the age of twenty-four he went to Italy where he pursued the study of anatomy, with unremitting zeal up to the time of his death, which occurred October 15, 1564. In 1847, his native city of Brussels erected a magnificent bronze statue to his memory.

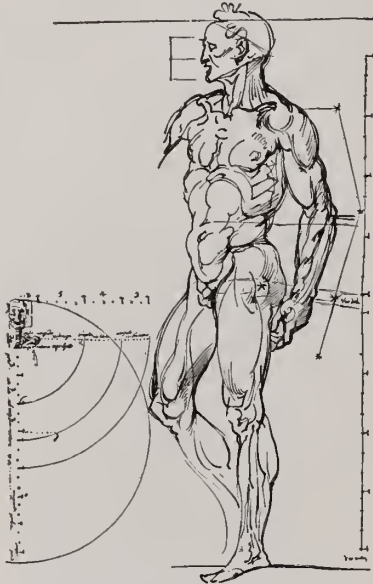
The student of medicine of the present day, who recognizes the name of Vesalius only in association with a small and insignificant foramen in the base of the skull, can hardly realize that it is to his great genius we owe the entire scheme of human anatomy, as a study involving accuracy of observation and description. Yet this is true, for to turn from the pages of his predecessors to the works of Vesalius, is to step from the bewildering glim-



Drawing of muscles by Leonardo da Vinci.

drawings in the anatomy of Galen to illustrate their own treatises. In Phryesen's work, entitled "Spiegel der Artzney," published in 1518, he gives us only a wretched caricature of the skeleton, a view of the thoracic and abdominal viscera, evidently drawn from the anatomy of the dog, one or two confused sketches of the brain, and a carefully executed picture of himself seated in majestic dignity, while cringing bareheaded before him is an humble disciple, listening with undoubting

mer of supposition and tradition into the light of fact and order. It is to be especially noted that, from the first, the great teacher availed himself of the assistance of the artist, and directed his interpretations of the subject at every step. It is possible that he himself learned much in teaching his associates, and it is certain that the value of his own labors was



Sketch of anatomical figure by Michel Angelo Buonarroti.

greatly enhanced by the skilled pencil which wrote his story in characters that all men could understand.

As the designers of the Vesalian illustrations many famous artists have been named, among them Tiziano Vecelli, Christoforo Coriolani, Titian, and his illustrious pupil, Jan Kalkar. It is probable that all of these contributed to his works. To the divine Titian has been ascribed the superb figures which illustrate his great work, "De Humani Corporis Fabrica," which raised Vesalius to an eminence that no other anatomist had reached before, and fastened to his name the title of Father of Modern Anatomy.

His "Magnum Opus," the illustrations of which are accredited to Jan Kalkar, was published in Basle in 1543. To men of science it was a revelation as an example of unprecedented anatomical research, and to the disciples of art the volume has always been precious on account of the harmonious union of strength and truthfulness in the designs, and beauty and symmetry of the forms. The bones and muscles are reproduced most skil-

fully and with greater anatomical exactness than had ever been attained before; the viscera, vessels, and nerves were less successfully portrayed, but it is true that the anatomy of these parts was, at that time, not so well understood. The main features, however, were faithfully described and portrayed, and the work as a whole was a miracle of wide and original research. It is difficult to say whether it was the text or the illustrations that exerted the greater influence over the contemporaries and followers of the author, but for a century afterwards the anatomists of Europe did little more than to compose variations upon the united achievements of Vesalius and Kalkar.

Vesalius was not without rivalry in the field of anatomical research. In 1545, two years after the appearance of the "De Humani Corporis Fabrica," a French physician named Charles Estienne published a book descrip-



Jan Kalkar's drawing of the skeleton for "De Corporis Humani Fabrica" by Andreas Vesalius.

tive of the dissection of the various parts of the human body, in which he used woodcuts of a most curious character. The author, whose work was commenced long before the appearance of that of Vesalius, was a practical anatomist and, although an original worker, he was far inferior to Vesalius, and made use of art in a much less intelligent way. In Vesalius the illustration though of the highest merit, was always subordinate to the subject of the text, while in Estienne's cuts the

anatomy often appeared to be little more than a medium for the fanciful ideas of the artist. Some of the drawings were, indeed, very striking as artistic compositions, but the figures were often placed in queer and repulsive positions, while the introduction of many non-essentials rendered the anatomical parts small and indistinguishable; as for example, a plate showing the entire form of a man in the foreground of a pastoral landscape, his calvaria hanging from a limb of a tree above his head, while his denuded brain turned towards the observer represents all the anatomy to be seen in the whole picture; and another, a full length nude figure of a woman seated in a chamber of classical design, has no other purpose than to display the contour of the external genitals. Nevertheless, except in the case of the muscles, which were miserably portrayed, the anatomy of Estienne's plates was for the most part fairly true to nature.

Another competitor of Vesalius, and a far more serious one, was the Italian physician, Bartolomeo Eustachio. He, more than any other anatomist of his time, enriched his science by accurate investigation. His published work on the anatomy of the kidney was an admirably thorough piece of original research. He also engaged in pathological research and is said to have been the first anatomist to introduce postmortem examinations in Roman hospitals.

Eustachius himself made most of the drawings to illustrate his anatomical writings, others were made by his relative and assistant Pier Matteo Pini of Urbino. Only eight of his drawings appeared during his lifetime, in connection with his "Opuscula Anatomica," published in 1564. Thirty-nine other engravings made by him remained unused until a hundred and forty years after his death, when the papal physician, Giovanni Lancisi, found them with the heirs of Pini and published them with his own commentaries in 1714. Despite their long slumber, the pictures were so little behind the age when they were introduced to the world that edition after edition was called for, the demand ceasing only at the beginning of the nineteenth century. The drawings were indeed in some respects even richer and more trustworthy in detail than those of Vesalius; and, although both drawing and engraving were feeble and inartistic, the scientific value of the plates more than counterbalanced their aesthetic imperfections.

The third period, extending from the middle of the sixteenth to the early part of the nineteenth century, may be called that of artistic engraving on copper. The process was not a new one, but had been practiced long before this time, at least as early as 1461, but no extensive use of it had been made in medical illustration before the seventeenth century, and the few examples that had appeared in medical books were of small artistic importance as compared with the contemporary work of the wood engraver.

The first important medical work embellished with copper-plate engravings was the "Historia de la Composicion del Cuerpo Humano" (1556,) by Juan Valverde de Hamusco, a Spaniard, who had studied anatomy under Colombo and Eustachius. The illustrations in this book were mostly copied from those of Vesalius, but the engraving on copper was skilfully done. One plate, however, not taken from Vesalius, is interesting as a curious instance of the tendency shown by the old anatomical artists to make the most



Anatomical figure by Juan di Hamusco.

of the subject from their point of view. It represents the figure of a man who, having just succeeded in divesting himself of his skin, stands in a pose of dignified self-approval, grasping the knife dripping with blood in one hand, while with the other he holds up to view his detached integuments, from the midst of which the flabby features of his face stare in feeble disapproval at the spectator.

The use of wood engraving in the embellishment of anatomical works did not end with the advent of copper-plate etching or afterwards, but it ceased to hold the important place it had hitherto occupied as a means of artistic expression. Many writings of great value, however, such as the contribution of Constantio Varoli to the anatomy of the brain ("De Nervis Opticus," etc., 1573), the "Historia plerarumque partium Humani Corporis" (1585) of Solomon Alberti, and the artistic treatise "Varia Commensuracion para la Escultura y Arquitectura" (1585) of Juan de Arphe were illustrated by woodcuts; but the power that stamped the cuts in Vesalius had disappeared.

In the seventeenth century copper plate engravings, which had been used for anatomical illustrations in the preceding century by Eustachius, held undisputed sway. The anatomical works of Giulio Casserio (1627), and those of his successor in the chair of Padua, Adrian van de Spieghel (Spigelius) were copiously and artistically illustrated by this process. Another valuable set of drawings was made a little later by the famous artist, Pietro Berretini of Cortona, for the anatomist Johannes Maria Castellanus, and skillfully transferred to copper, but, unfortunately, these plates, like those of Eustachius, remained hidden, and it was not until a century later, in 1747, that they were discovered and published: a lapse that was the more to be deplored since they gave to the anatomy of the nervous system an artistic manner of representation and accuracy of detail not equalled by any of his predecessors.

In the drawings of Berrentini, as in most cases where artists have interested themselves in the work of the anatomist, the grimness of the motive disappears under the artistic touch which injects life, and even humor into the composition.

The great landmark of progress in the still somewhat barren field of medical science, the immortal "Exercitatio Anatomica de Motu Cordis et Sanguinis" by the celebrated English physician, William Harvey, was published in 1628, but the book owed nothing to the quality of the copper plates which illustrated it, nor did English art make a creditable showing in any of the anatomical publications of the seventeenth century. The plates of Samuel Collin's "System of Anatomy," published in 1685, though executed by one Faithorne, con-

sidered the ablest engraver of his time, displayed little excellence, while those of a contemporary treatise upon the muscular system by John Browne, a surgeon of London, have even less claims to artistic merit.



Anatomical figure by Peter Paul Rubens.

The dissected figures in the latter case, drawn with pretentious badness, are placed in the most curiously affected and self-conscious attitudes, as though proud of the exhibition of their anatomical details. The pictures, however, were interesting from the fact that the names of the structures were, for the first time, engraved on the parts, a practice afterwards followed by Gray and Holden, and which has continued its popularity to the present time.

The palm of artistic pre-eminence in the medical books of the seventeenth century belongs to Holland. The publication in 1865 of the "Anatomia Humani Corporis" of Godfried Bidloo, a professor of anatomy at the Hague and Leyden, did not contribute much to science, but the author had the sagacity to associate with himself in the work the eminent artist, Gerard de Lairese of Amsterdam, and was thus enabled to produce a book which to the present day has remained greatly prized, if little read, for the accuracy and strength of the drawings. Some of the plates, however, are too naturalistic both for art and for science, but in two of the osteological designs, which are particularly noteworthy as works of art, the temptation to pictorial dis-

play is too strong for the artistic mind to resist; in one of these, a figure standing within the entrance of a sepulchre holds up an hour glass as if to remind us that our condition is separated from his only by the moments of passage of a few falling grains of sand; and in the other, the animated skeleton is seen descending into the grave, not without a certain grace and dignity, to escape from a world where the grim simplicity of the uncovered bones could find neither condolence nor repose.

Before leaving the seventeenth century, it may be stated that the two greatest artists of that period, Rembrandt and Rubens, have left their impress in connection with medical science; Rembrandt in his celebrated picture of the physician Van Tulp demonstrating the structures of the arm to some of his compatriots (painted 1632), as well as two other works less known, and Rubens by several bold and characteristic studies of the surface anatomy of the body.

In the next century (the eighteenth), anatomy was elevated by the publication of some splendid anatomical atlases, printed in the most expensive style and embellished with exquisitely engraved plates. Practically, there was but one method of reproduction during this period—that of etching on copper—for the wood block had fallen from the high rank it formerly occupied, and produced no more pictures like those engraved for Guido Guidi and Vesalius.

The list of important works is too large even to name, but as examples for beauty of illustration may be mentioned the "Osteographia, or Anatomy of the Bones" by William Cheselden (1733); the "Tabulae Selecti et Musculorum Corporis Humani" of Bernhard Siegfried Albinus of Leyden (1747) and the "Anatomia Uteri Humani Gravidi," by William Hunter (1774). Cheselden, a man of artistic taste, spared neither trouble nor expense to secure the most artistic reproductions of his specimens, but he was above all a man of science, and he was equally as zealous that they be accurately presented. The result was, as would be expected, a magnificent volume of great artistic excellence as well as fidelity to nature. The "Osteographia" was a distinct contribution to the anatomical science, and an ornament to the medical literature of the day.

The Atlas of Albinus was even a more scientific work than that of Cheselden. Myology had been well and broadly treated in the illus-

trations of many preceding works, but the detail of form and attachments of each individual muscle were represented in this book for the first time, and the task was performed with so much thoroughness that little has remained to be added. The drawings of the various figures displayed great skill and accuracy and, although the artist lacked ability to reproduce the tectorial character of the structures, he so ably preserved the essential truths that the great atlas fully merits the high rank it held during three generations as a standard of reference both for artist and anatomist. It was not until the middle of the nineteenth century that its place was taken by other works more suitable to the requirements and pocket of the student. An illustrated volume by the same author confined to osteology, "Tabulae Ossium Humanorum" (1784), is especially to be remembered as being the first attempt to show the exact area of muscular and ligamentous attachments upon the bones.

William Hunter's treatise on the Gravid Uterus ranks with Cheselden's "Osteographia" as an ornament to the library, for the best art available at the time had been used on a subject that would appear to be little capable of aesthetic treatment. The foremost artists of the day were employed upon the plates, and one of the number, the famous Sir Robert Strange, is said by Hunter himself to have given "his advice and assistance in every part of the work with a steady and disinterested friendship."

The fourth or modern period of anatomical illustration may be dated from the close of the second decade of the nineteenth century. Art has become more and more essential to medical science as an aid both to record and expression. The diagram, the more highly finished drawing, and the model serve as a new language that speaks with strength and clearness where written or spoken words would convey their meaning slowly and imperfectly. The new period has been characterised by the multiplication of methods of pictorial reproduction. Engraving on copper, which stood at the forefront during the last period, gave way to cheaper and more readily adaptable processes. Of the new processes, lithography, invented in 1796, was destined to hold an important place in medical illustration, as was also photography and photographic processes of engraving which came in use later on.

The first medical essay of moment in lithography appears to have been the engraved plates of the "Arteries," published by Friedrich Tiedemann, in 1822, but the result here was by no means striking. It was not long afterwards, however, in 1831, that Jacob, the father of the modern French school of anatomical drawing, unveiled the possibilities of engraving on stone in the great anatomical work of Bourguery. This magnificent achievement of Jacob's gave a wide impetus to anatomical illustration by the new process, and many works of high scientific value and artistic excellence, illustrated in this manner, made their appearance in rapid succession. The most important of these, from an artistic point of view, was Hirschfeldt's "Anatomie du Systeme Nerveux" (1853). The illustrations for this work were made by the French artist Jean Leveille, the favorite pupil of Jacob. This gifted man was an accomplished anatomist as well as artist and thus combined in his person a profound knowledge of the subject with an ability to depict it in the most skilful and accurate manner. In the designs for this book, Leveille reached the highest point of artistic excellence and placed France beyond rivalry in anatomical illustration. Another book illustrated by lithographic plates, deserving of mention, is the "Anatome Artistic du Corps Humain" by Dr. Paul Richer of Berlin. This is the best treatise on Artistic Anatomy that has ever been written, and is unique in the fact that this talented physician not only wrote the text but also made the drawings to illustrate it.

Since the advent of lithography, the process has been carried to such a high degree of development, that by this method we are now enabled to utilize colors in reproduction in so perfect a manner as to give to the structures an appearance closely resembling their natural state. Multicolor lithography, as it is called, has been most successfully employed in medical illustration. The first and, up to this time, the only anatomical work to be printed by the color process has been the beautiful Atlas of Johannes Sabotta of Wurzburg. The superior quality of the drawings and the life-like effect given them by the colors renders this book a valuable contribution to the anatomical science.

Photographic processes too have made rapid strides of advancement. The half-tone method,

based on photography, gives most excellent results, and is now even more extensively employed for book illustration than is lithography. The advantage of the half-tone, aside from its cheapness, is the unerring exactness with which drawings are reproduced. This process is well exemplified in Spalteholz's magnificent Atlas, and the monumental work of the American anatomist, Dr. George A. Piersol of the University of Pennsylvania. It is needless to add that, in all reproductive work, the merit of the illustration depends not so much upon the manner of its reproduction as upon the deft hand of the artist who fashioned it.

In conclusion, the service that art has rendered to anatomy is sufficiently apparent, even in the few pictures I am able to show you to-night. We all know the great advantages to be derived from book illustration as a means of fixing and clarifying our knowledge, and how often an accurate picture appears to us like an oasis in the midst of a desert of unintelligible text. It is true that pictorial anatomy, like every other good thing, may be misused. It is a poor substitute for direct personal study and examination of the structures themselves, although for many parts of the body it is a necessary one for the ordinary student, but it is always an efficient preface and an invaluable sequence for such parts, for it shows us better than any written description what to look for, and it recalls to us what we have seen.

The service that a love of art may confer upon us personally and individually is a matter of a different kind. The study of art is a mental culture of the highest order; it gives a training to the eye and hand of inestimable value to the surgeon and the anatomist, and there is no diversion that can reflect more rays of sunshine across the dull shadow of the daily routine of our professional life. The medical profession has numbered among its ranks many distinguished patrons of art, and not a few men who have displayed a power of artistic attainment that would have made them great artists, had not their destiny guided them to eminence in the medical sciences instead. In this class belong the famous anatomists, Bell, Maclise, Holden, and Godlee of England, and Keen, McClellan, and Spitzka of our own country. Though better known as anatomists,

they were artists as well and, by their achievements, added lustre to both professions.

Of the possession of a skilful knowledge and facility of drawing to a teacher of anatomy, little need be said, for it is obvious that one who can demonstrate an idea clearly and succinctly by a few strokes upon the blackboard will, other things being equal, best claim and hold the attention of his students and let them leave with the most lasting mental impression of the subject of his lecture.

THE RELATION OF BIOLOGY TO SURGERY.*

By J. SHELTON HORSLEY, M. D., Richmond, Va.

The privilege of addressing the members of the Atlanta Academy of Medicine, of the Fulton County Medical Society, on such an auspicious occasion as the opening of their new home, is an honor that I greatly appreciate. There is a spiritual inspiration about the dedication of a monument, the unveiling of a statue, or the opening of a home that is hard to estimate. It seems to mark a distinct era in the lives of the individuals or of the society for which such an event occurs. It offers an opportunity for resolutions of doing better work, for broader vision, for greater brotherhood among the members of the medical profession that are directly concerned in such an event, and for an elevation of ideals that will not be satisfied with anything but the very best in scientific medicine and surgery. It is a great privilege to be a participant in such an event.

I have chosen for the subject of my address "The Relation of Biology to Surgery," because I feel that the future of both medicine and surgery is very intimately involved in the proper appreciation of biologic principles. Biology covers, to be sure, a wide field and is often rather vaguely defined. I am using it as the science that has to do with living tissue in its various manifestations. This necessarily embraces physiology, because physiology is a study of normal function, as well as pathology, which broadly includes the study of abnormal function and of diseased tissue. In the living body, all the reactions of tissues to disease or trauma are biologic processes.

In the science of medicine, as in religion, certain great prophets stand out who mark the

way and whose teachings and vision are too frequently neglected until succeeding generations. The work of such a man as John Hunter is classic on account of the marvelous accuracy of observation and the logical deductions from the observed facts. The epoch-making works of Pasteur and of Lister are now fully appreciated. In this goodly company there is a man whose reputation is less widely known, and yet, though his chief work is contained in the lectures given at the Royal College of Surgeons in England in 1860, there is an amount of accurate observation and philosophical deduction that should be the admiration of every physician and surgeon. I refer to the lectures of John Hilton, which were published under the title of "Rest and Pain." Pre-eminently, he emphasized the causation of pain as a protective phenomenon and the beneficial influence of physiologic rest. He may be considered a pioneer in thus calling attention to the great value of the observation of biologic principles in the comprehension and the treatment of disease.

We of the medical profession are sometimes too often inclined to confuse the relation of cause and effect in treating disease. This applies not only to pharmaceutical remedies but to surgical measures. Accurate observations such as Hilton's frequently clear the atmosphere and show a sharp outline of the true condition. Particularly in surgery, we must never forget that the patient is a highly organized mass of living tissue, every cell of which is capable of a certain definite reaction to trauma or disease. Surgical operations that look well on a cadaver may be utterly unsuccessful on a living human being. A beautiful operation that results in the death of the patient is not satisfactory surgery. The mechanical portion of the technic is important, but it should not entirely dominate. The ideal is to be thoroughly imbued with the principles of the biologic sciences, thoughtfully to apply these principles, and at the same time to be mechanically skilful.

The science of anatomy is essential to the mechanics of surgery. He would be a poor locomotive mechanic who did not understand the construction of his engine; and in operations on the neck, for instance, a surgeon who is ignorant of anatomy would be like the proverbial bull in a china shop. A knowledge of anatomy is essential to good surgery, but

*An address delivered December 7, 1922, by invitation, at the opening of the new home of the Atlanta Academy of Medicine of the Fulton County Medical Society.

in the ever shifting problems of tissue repair and metabolism, physiology is just as necessary. The principles underlying an operation are correct only if they conform to the laws of physiology and of repair of the tissue or organ that is affected. If we could get away from blindly following what some one says merely because he says it, and do things because of reasons that have sound biologic foundations, we should undoubtedly do work more satisfactory to our patients and to ourselves.

The ideal in surgery should be first of all a thorough and complete removal of the pathology, and a close second to this should be restoration of the physiologic function. These ideals cannot be intelligently even approximated without a consideration of the biologic principles not only that accompany the disease, but that are an essential part of the process of repair after an operation or of the readjustment of the tissues because of changed anatomical relations brought about by operation.

DRAINAGE.

Probably we can best illustrate the intimate relation which biologic processes have to the mechanical procedures in surgery by considering surgical drainage. An appendicular abscess is opened and drained by the insertion of a tube *down* to the abscess. The pus is drained uphill. There is no effort to secure dependent drainage by gravity, and yet the vast majority of these abscesses heal satisfactorily with this treatment. An abscess of the same kind of infection in the muscular tissues or in the pleural cavity would probably not heal unless drainage was made at the most dependent portion. Why, then, does this abscess heal readily when drained from its roof, whereas the same type of pus elsewhere requires gravity drainage?

It is common knowledge that gauze drainage is often beneficial. A cigarette drain carried to the bottom of an abdominal wound with local peritoneal infection limits the inflammation and promotes cure, but if we were to examine this drain within twenty-four hours after being placed, we would find the meshes and fibers of the gauze plugged with coagulated lymph, so instead of acting as a drain it really becomes a plug—yet it is a common experience that this is a very beneficial procedure, and often the gauze drainage is better than a tube. Surely such contradictory conditions

cannot be reconciled by any law of mechanics.

Let us consider the biologic processes that may explain the beneficial effects of surgical drainage.

First of all, we must recognize that the body has certain definite biologic defenses against trauma and disease. These defenses are usually not perfect, and sometimes are quite feeble, but with very few exceptions they exist. The defenses against the injurious effects of foreign substances in the epithelial lined cavities where such substances are prone to lodge are highly specialized. Thus, the stomach emits, by vomiting, food that is spoiled and many irritating drugs. Excessive salivation which accompanies nausea tends to dilute the offensive material and to protect the mucosa of the mouth and the esophagus. Irritating material in the nose produces a profuse secretion which may wash away the irritating substance, and sometimes there is sneezing which is a violent propulsive force. In the eye a cinder causes spasm of the eyelid and a flow of tears to wash away the cinder. An irritating body in the larynx, bladder or rectum immediately calls for spasm. In the endothelial lined cavities, however, and in solid tissue, the chief, if not the only, method of extruding an irritating foreign substance is by a flow of lymph. This is such a common occurrence that we are inclined to overlook it. If a boy sticks a splinter in his toe, it may not annoy him for one or two days. Then there is some swelling about the splinter, and the tissues around it "fester." For some days there is a discharge of pus, which becomes thinner, and then on inspection a small black speck can often be seen. If he is a normal country boy, his mother usually picks out the splinter with the point of a needle, and the discharge ceases by the next day.

This homely illustration demonstrates the foundation principles of surgical drainage. An irritating substance in solid tissue or in a serious cavity causes the lymphatics in the neighborhood of the irritation to pour out abundantly lymph or serum around this foreign body. If bacteria are present, pus is formed and this augments the flow of lymph because it adds an additional irritation. The splinter, for instance, which was firmly fixed in the tissues at first is somewhat loosened, and the constant flow of lymph around it tends to wash the splinter toward the surface along its track of entrance. After its removal there

is no longer a stimulus for the flow of lymph, and the wound quickly closes.

These phenomena are well known in surgical experience. The beneficial results of surgical drainage, then, come partly from relief of pressure in a suppurating cavity, which thus lessens the absorption of the toxic products, and partly from the stimulus to the neighboring lymphatics to pour out the lymph or serum into the drainage tract. This explains why an uphill drainage will be satisfactory in the abdomen, but not in the pleural cavity or in the solid tissues of the thigh, for the peritoneum is a huge lymphatic sac, and its lymph supply is so abundant that the irritation from the foreign substance of a drain, plus the local infection, will direct an ample lymph stream along the drain and so wash out from the peritoneal cavity the bacteria and their toxic products that would otherwise be absorbed. In solid tissues or in the pleural cavity where the lymphatic supply is much less than in the peritoneal cavity, there is not enough of the serum or lymph available to clean the abscess cavity, so that toxic products cannot be satisfactorily eliminated solely by the outpouring of lymph. Consequently, gravity must be invoked.

Gauze is more irritating than rubber. The application of dry gauze to a wound is quickly followed by an exudate of lymph. Nature pours into the meshes of the gauze an abundant quantity of lymph in an effort to extrude the gauze, which is irritating. For this reason we will cover a fresh wound with gauze when pus must be evacuated over the wound, and we are accustomed to see very little contamination of the raw surface if it is thus protected. The gauze reverses the normal lymph flow, and the lymph supply is poured out into the gauze instead of absorbing the toxic products of the bacteria. For this reason a cigarette drain is often of more value in limiting infection and directing the lymph current toward it than would be a tube. The combination of a tube and a cigarette drain in large cavities is frequently most effective.

HYPEREMIA.

The principles that govern repair and nutrition are the underlying essentials of most surgical procedures. Nutrition comes largely or entirely through the blood stream, and depends upon the caliber and the character of the vessels which deliver the blood, the capil-

laries which distribute it, and the veins which return it—as well as upon the quality and quantity of the blood itself.

Walter B. Cannon, of Harvard, has shown the very striking influence emotions may have upon the quality of blood and upon its distribution. He has found that under great emotional or physical strain an excessive amount of sugar is often found in the blood and this produces a temporary glycosuria. The secretion from the adrenal glands apparently continues the impulses that are initiated by the sympathetic system and puts the body on a war footing. This lessens the peristalsis of the intestines, increases the action of the sphincters, dilates the bronchioles, increases the caliber of the arterioles to the muscles while constricting the arterioles of the body surfaces, and dilates the pupil. All of this mobilizes the energies of the body, and temporarily interferes with the absorption of nutrition from the gastro-intestinal tract. Such a process may amount to little if it is temporary, but no one can doubt that the condition of the war footing produced by the emotions, added to the necessary strain of the surgical operation, to some extent increases the risk. This, then, shows the necessity for the conservation of the patient's energies by measures that tend to prevent a useless exhibition of the patient's emotion of fear or anxiety.

The problem of local hyperemia has not infrequently been a puzzling one. Occasionally therapeutic measures have been adopted along the same principle that Hertzler says some surgeons utilize in the abdomen, namely, when an organ is tied up by adhesions, the adhesions must always be released, and when it is free, adhesions must be created. Too often there has been a tendency arbitrarily to decrease hyperemia when it is present, or to promote it when absent, without regard to what will be accomplished by such procedures. The old method of treating subacute or chronic inflammation of the joints or tendons was to paint the skin over the affected part with iodine. This was done on the theory that the application of iodine would draw blood *from* the injured region, and so by relieving congestion would benefit the inflamed tissues. It has been well known that such applications are often beneficial, but we are now aware that the benefit is attained not by drawing blood *from* the tissue, but by bringing more blood *to*

the injured tissue, and so increasing the metabolism and nutrition that a more rapid repair can take place. How often we see a chronic indolent wound that heals after a vigorous application of nitrate of silver, which cuts down the superficial granulations. The action of the silver, of course, destroys useless and poorly built granulations, but probably its chief beneficial result is the creation of an increased hyperemia, which will permit the construction of proper granulations that will go through the normal cycle and result in scar tissue and healing.

Some chemicals promote a hyperemia more readily than others, but may also produce too much local destruction. The silver preparations are remedies that seem to cause a maximum amount of hyperemia and a minimum of destruction of tissue. Frequently, too, such applications are followed by relief from pain in painful ulcers, where nothing else is effective. In such instances there is doubtless an ischemic pain in which the nerve fibrils do not receive a sufficient amount of blood for their needs, and consequently register pain until the hyperemia relieves their distress.

The influence of hyperemia in tuberculous diseases has long been known. This has been utilized to the benefit of the patient by the method of Bier. The pathologic process in the formation of the tubercle causes a hyalinization of the minute blood vessels, so that in the tubercle is a giant cell, with surrounding tubercle bacilli and epithelioid cells, to which there is practically no blood supply. If we can flood the tubercle with rich blood, the tuberculous process is overcome and nutrition is sufficient for the formation of normal granulation tissue and healing by scar formation. Blood is a great enemy of the tubercle bacillus, which in most tissues can only live because of the pathologic processes tending to decrease or shut off the blood supply to the tubercle.

It is doubtless within the memory of many surgeons and physicians when tuberculous ascitic peritonitis was treated in many weird and fanciful ways. One surgeon would make a long opening, evacuating the fluid and manipulating the intestines. Another, after incision, would dust the peritoneal cavity with some particular preparation. Still others insisted upon letting the sunlight in. Many used drainage of various kinds. A large percentage of cases of ascitic tuberculous peritonitis recovered after these operations, and each sur-

geon was thoroughly convinced that his own method was the peculiarly correct one. It was some time before it was discovered that the evacuation of the fluid and the manipulations produced a hyperemia, and it was the hyperemia that cured.

But excessive or constant hyperemia may not be an unmixed blessing. Just as over-nutrition has a deleterious action on the whole body, so over-nutrition of local tissue by excessive hyperemia may have a harmful effect. It must be constantly borne in mind that nature in what we consider normal moods does not deal in excesses, but in a happy mean, and this frequently is within narrow limits. Too much food produces disease just as would too little or improper food. For every set of flexor muscles there is a controlling set of extensor muscles. Regulation of the heat mechanism is wonderfully delicate, and provides for a practically constant body temperature in mammals. Excessive acute active hyperemia may defeat its own purpose by causing stasis and clotting, and so filling the vessels with clots as to decrease nutrition at a point where it is most needed. Chronic hyperemia may produce excessive scar tissue. Hyperemia may render the nerve terminals supersensitive, so that they are supersensitized to pain. This is one of the reasons why hyperemia around the point of inflammation produces marked tenderness and pain. This, too, in turn is often a protective mechanism, which tends to keep the part at rest and to protect against trauma.

Recent researches by Krogh, Hooker, Danzer and others have thrown much light upon the physiology of hyperemia. (Evidence of Functional Activity on the Part of the Capillaries and Venules, by D. R. Hooker, *Physiological Review*, Vol. 1, No. 1, pp. 112-141). It has formerly been considered that hyperemia was dependent upon the arterioles: that the action of the muscular coat in these small blood vessels largely controlled the supply of blood to the tissues. As the histology of the capillaries shows only a layer of endothelium without any muscle, it was assumed that the capillaries possess no power of contraction. It has been proved, however, that this is not true, and that the capillaries have a wide range of contraction or dilatation, even though they do not possess a muscular layer. This seems to be due to the alteration in the size of the endothelial cells composing the capillaries, and is effected by chemicals or by nervous stimuli.

Broadly speaking, dilatation of the capillaries and venules seems to be caused by chemical stimuli, and contraction by nervous impulses. Histamine produces strong contraction of smooth muscle in the arterioles, but causes an intense dilatation of the capillaries and of the venules. The venules have a connective tissue layer in addition to their endothelium, but no muscular coat. The toxic products of wound shock have been shown by Cannon and others to have an action on the capillaries similar to the action of histamine, which appears to be a poison to the endothelial cells of the capillaries and venules, causing them to shrink. Thaysen has ascribed the remarkable variation in the number of red cells in a case of polycythemia to changes in the tone of the capillaries and precapillaries of the skin.

SURGERY OF THE BLOOD VESSELS.

The surgical treatment of slow or threatened gangrene has been much discussed. Carrel and Guthrie, in 1906, after two experiments, concluded that the blood circulation in the leg of a dog could be completely reversed within six hours. They severed the femoral artery and vein just below Poupart's ligament and united by suture the cardiac end of the artery to the distal end of the vein, and the distal end of the artery to the cardiac end of the vein. After a few hours, when red blood was seen returning, they assumed that the circulation was reversed. I think it can now be stated, however, that it is impossible to reverse the circulation in this manner. In a series of experiments which have been reported, we have shown that when the severed femoral artery and vein of animals are sutured together in a reversed direction there is no real reversal of the circulation, and the arterial blood never goes more than a short distance below the knee and is then quickly switched back to the iliac veins through the dilated collateral vessels. Instead of the heart action mechanically breaking down all the valves in the vein, it biologically strengthens most of them. Evidently what happened in Carrel's experiments was that dissection paralyzed the vasoconstrictor nerves, and the dilated capillaries permitted red arterial blood to flow through unchanged. When the sciatic and crural nerves are divided in a dog, red blood appears in the femoral vein because of the extreme dilatation of the capillaries. Clinically, this is often seen to follow an application of the elastic tourniquet which, if

left on for even a short time and removed, produces an intense flushing of the limb until the temporarily paralyzed vasoconstrictors have resumed their function. Many useless operations have been done attempting so-called reversal of the circulation in threatened gangrene. The only good accomplished was damping back the venous blood and forcing the small amount of arterial blood that reached the tissues to stay longer than it normally would and so deliver to the tissues more nutrition than would be possible when the arterial blood was quickly drained off by unobstructed veins. This can be very simply effected by ligating the femoral vein.

Surgery of the blood vessels shows the application of biologic principles. In young individuals the main arterial trunks can usually be ligated with the preservation of the nutrition of the limb. This, however, is not invariably true, for ligation of the popliteal artery or of the lower portion of the brachial artery may be followed by nutritional disturbances, or even by gangrene. In a few instances the wounds of blood vessels can be sutured, and even a section of a vein may be transplanted between the ends of an artery where it is necessary to remove the injured segment. This work, however, requires some special training, and frequently when the operation is indicated the conditions are such, as in military surgery, that make efforts at immediate arterial suture unwise. Later on, if an arterio-venous aneurysm forms and the coats of the vessels become infiltrated with scar tissue and thickened, arterial suturing with the delicate needles and silk as used in the experimental laboratory is impossible of application. If there is any reasonable doubt of the collateral circulation around an aneurysm, tests which have been described by Matas should be employed before the artery is tied. The circulation, however, can be improved by pressure over the main trunk for a limited time each day, or by the application of the aluminum band which has been devised by Halsted and by Matas, and which can be so adjusted that the lumen of the vessel is not entirely occluded. After this band is left on for several days or longer, the collateral circulation may be developed to an extent that complete occlusion of the main arterial trunk will be safe. Such a procedure in ligation of the common carotid artery in middle-aged or elderly patients is exceedingly important,

especially if the operation be done under local anesthesia when the ordinary tests of function of the brain can be made during and immediately after the operation.

In the preparation for the transference of a pedicle flap, the principle of development of the blood supply by gradual increase and dilatation of the vessels from one portion of the flap is exceedingly valuable. A long, narrow flap for the face can be outlined from the forehead or from the neck and shoulder or chest, and completely undermined only near its pedicle. The flap is gradually dissected free under local anesthesia, doing the work in stages at intervals of a few days. In this way the blood supply is transferred slowly to the pedicle, and the flap can be turned into position without fear of necrosis. This is probably better than dissecting the flap free except at the pedicle and replacing it in its bed, because a too violent and sudden change is made in the blood supply, which may result in a partial necrosis—whereas when this dissection is done in stages the blood vessels are gradually trained to take on the additional burden. Five days after the flap has been transferred into position, a soft-bladed clamp or a rubber band is placed on the pedicle for fifteen minutes to half an hour. This procedure is repeated each day for a week or ten days, when the flap can be severed with the assurance that no portion of it will be lost because of faulty blood supply.

Connective tissue is a very hardy tissue. It will stand more insults and more trauma than highly differentiated tissue such as muscle or glands, and at the same time it can live on less nutrition. Consequently, the question of the amount of scar tissue after plastic operations sometimes depends upon the local nutrition, though many other things may determine scar tissue, such as infection, and the personal idiosyncrasies of the patient. Infection acts largely by destroying the more highly differentiated tissue. If, then, it is essential to avoid as much scar tissue as possible, the nutrition of the flap should be particularly considered, for if the blood supply is cut down to a minimum, scar tissue will dominate—and not only that, but infection is more likely to ensue when nutrition is at a low ebb. For the immediate vitality of the flap, for the future cosmetic appearance, and to avoid scar tissue contraction, the development of a satisfactory

blood supply, by considering these biologic principles, is quite necessary.

SURGERY OF THE GASTRO-INTESTINAL TRACT.

Surgery of the stomach frequently suffers from the lack of application of physiologic principles. There is no one operation satisfactory in all different types of ulcers of the stomach or duodenum. Much depends upon the location and the extent of the ulcer. Gastro-enterostomy has a distinct field, but only when the pyloric portion of the stomach or of the duodenum is so extensively infiltrated by inflammatory products or so affected by the extent of the ulcer or by the resulting cicatricial contraction that it would be impossible to restore this greatly damaged tissue to normal. There is an analogy between gastro-enterostomy and amputation of an extremity. When the tissues of an arm or leg have been so thoroughly damaged as to make it impossible to restore function, then amputation may be considered. So, when the pyloric outlet of the stomach or of the upper portion of the duodenum has been irreparably destroyed, a short-circuiting operation has a very proper field. Gastro-enterostomy is not a drainage operation, because the stomach is a hollow muscular organ and drainage is best accomplished by making an opening as nearly as possible in the axis of the peristaltic waves. We do not drain the urinary bladder from the most dependent portion, and we perform an enterostomy in the distended loop of bowel that is nearest the incision, and not the loop that is most dependent in the pelvis, because we know that normal peristalsis will keep the bowel empty when the opening is made. The dumping of the acid gastric juice into the jejunum, which is accustomed to alkaline contents, is certainly an unphysiologic procedure, yet amputation is also an unphysiologic procedure. Gastro-enterostomy is most beneficial when the pyloric outlet has been permanently closed, for the alkalinity of the duodenal contents remains high, and cannot be lowered by the passage of gastric juice through the pylorus. Consequently, this alkalinity can protect the jejunum in the region of the gastro-enterostomy stoma from the action of the acid of the gastric juice. However, when there is a small ulcer which can be excised, or when there is occasion to give rest and relaxation to the pyloric end of the stomach because of the excision of a gastric ulcer near the cardiac end, a pyloroplasty is indicated. By the division of the pyloric

sphincter and its adjunct gastric muscles the spasm which frequently accompanies an ulcer in this region is overcome and the stomach can empty its contents with a minimum amount of effort because of the diminished resistance at the pylorus. Here we take advantage of the general principle of physiologic rest in lessening the obstruction which would call for strong contractions in the stomach wall. In this manner the normal physiologic function of the stomach is restored.

The same principle has been utilized since the early days of surgery, in operations on the rectum, when the sphincter ani is temporarily paralyzed by division or divulsion in order to promote healing of an ulcer within its grasp or higher up in the rectum. Such a procedure not only gives rest, but provides an easy exit for the fecal contents, so there is not the same necessity for strong contractions of the colon and sigmoid which would be necessary to overcome a spastic sphincter.

It seems rather definitely settled that there is a sensory nerve supply to the stomach and intestines. It is a meagre supply, however, and the sensory nerves terminate in the muscular coats of the stomach and intestines and do not reach the mucosa. They are stimulated largely by certain types of pressure. Around the region of an ulcer they become particularly sensitive, just as the sensory nerves would be sensitive around any inflammation on the surface of the body. It is doubtless for this reason that the strong peristaltic waves produce discomfort in the region of an ulcer in the stomach or duodenum; not only are the peristaltic waves stronger than normal, but the nerves themselves are more sensitive.

In surgery of the intestine, the work of Cannon and Murphy in their studies of peristalsis after resection of the bowel has called attention to the fact that in lateral anastomosis the food must be pushed through the opening by the peristalsis in the upper end. The incision in the intestinal segments involved in the lateral anastomosis destroys the action of the circular muscles. If a pouch is left at either end, there is a potential source of trouble. In some instances, however, when the bowel is small and the mesentery fat as in stout patients, a lateral anastomosis is essential, as an end-to-end cannot always be safely done under these conditions. It is necessary to close the triangular space formed by the mesentery, as it widens to encircle the bowel,

and to clamp and tie every raw surface in the mesentery before the bowel is opened. In this way infection is avoided. The bowel should also be cut from the mesenteric border outward. Whenever an end-to-end operation can be done safely, there is undoubtedly a more nearly perfect restoration to the physiologic function than when a lateral anastomosis is performed.

Murat Willis has recently advocated the so-called ideal cholecystotomy. In cases in which there are a few stones in the gall-bladder, but the gall-bladder appears otherwise normal, without adhesions or thickening, drainage of the gall-bladder, as he has pointed out, seems unnecessary, and is followed by adhesions that are frequently crippling. He opens the gall-bladder, removes the stones, and sutures the gall-bladder. In a certain limited number of cases this is an excellent procedure. It not only removes the pathology, but it does no unnecessary mutilation, and restores the gall-bladder to its physiologic normal. This, of course, is only one of the operations that may be necessary upon the gall-bladder, but it shows that here, as elsewhere in surgery, we must always remember the ideal of first removing the pathology, and then so far as possible restoring the physiology.

NEUROLOGIC AND BONE SURGERY.

There are many problems in neurologic surgery which require some knowledge of physiologic principles in order to be settled satisfactorily. Spiller and Frazier have demonstrated that section of the posterior sensory root of the gasserian ganglion produces what is called "physiologic extirpation" of the gasserian ganglion. It has been known for years that a nerve which is injured on the central side of its ganglionic cells does not regenerate; yet when the operation of division of the posterior sensory root for tic douloureux was suggested, it was received with some skepticism. This operation is safer than surgical extirpation of the gasserian ganglion, and is followed by less trophic disturbance. The plugging of foramina in the skull from which neuralgic sensory nerves have been removed in order to prevent regrowth of the nerves has sometimes been done with metal screws. Because an iron screw can stop a hole in a piece of wood is not necessarily a reason why it should be employed in living tissue. On the other hand, some substance that does

not cause reaction in bone is preferable. What happens after an iron screw is applied? Nature in an effort to extrude the irritating foreign substance removes lime salts in its neighborhood, the bone softens, the screw becomes loose, and the nerve can grow around it.

The fashion for plating fractures fortunately is on the decline. Hundreds and probably thousands of fractures have been plated with heavy metal plates for no reason except that it appeals to the mechanical sense and because some eminent surgeons advocated this operation. In many cases it is followed by attempted extrusion of the plate, and the plate has to be removed. To the casual observer it seems strange that permanent union does not always occur when a nice cabinet joint is made between the ends of a fractured bone, which are held securely in position by steel plates and screws. The same process goes on here as when an effort is made to plug a foramen in the bone with iron. The iron is an irritating foreign substance and, in order to extrude it, nature causes an absorption of the lime salts. As a result, a screw which may at first be firmly fixed in the bone soon becomes loose. But more important is the fact that osteoporosis is induced in this effort at extrusion, and callous formation is thereby prevented or retarded. A poorly fixed fracture without the use of metal is more likely to give eventual good results than the neatest union with heavy plates and screws.

BASAL CELL CANCER.

The biologic processes that concern immunity are directly linked with the treatment of many diseases. The study of cancer, which has fascinated laboratory workers as well as clinicians, has shown that there is a tendency to resistance of most cancerous processes, and that the various types of cancer frequently develop in different ways. The basal cell cancer of the skin—or the rodent ulcer, as it used to be called—shows a very definite and constant peculiarity in that it does not metastasize, but extends only by continuity or contiguity of tissue. This is impressive when we recall that a basal cell cancer may occupy the same region of the face as the spinous cell often occupies, and consequently has access to the same lymphatics. The cells are usually smaller than the spinous cells, and should gain access to the lymphatics just as easily as the spinous cells do. It seems most probable that

the basal cells are taken up by the lymphatics, but do not find favorable soil, and consequently perish; while the cells of the more malignant grades of spinous cell cancer can grow in the lymph glands and channels.

It may be assumed, then, that there is something in tissues at a distance from the basal cell cancer that causes an insuperable resistance to the cells of this neoplasm. This is not true of the spinous cell cancer, particularly of the more malignant grades, which may flourish wherever they are deposited by the lymph channels.

A crude illustration may show this biologic difference: If there was a field containing dry broom-sedge, and a fire was started in the middle of it, not only would the fire burn from this point, but if there was carried a burning brand to any other part of the field, it would also burn there. This may be likened to the spinous cell type of cancer, in which there is very little resistance to destruction by fire, even at a point distant from the original fire. If, however, the field of broom-sedge was damp, and a fire was started in the middle with a sufficient amount of inflammable material to dry the broom-sedge in its immediate vicinity, the fire would extend as far as the heat had dried the broom-sedge. If a burning brand should be carried into other portions of the wet field, it would not start a fire, because the dampness would render the broom-sedge unflammable, unless the fire was sufficiently large to dry the broom-sedge first. This might be compared to the basal cell type of cancer.

It appears to be perfectly useless to treat an extensive basal cell cancer by operation with a knife. The tissue in the immediate neighborhood of the cancer has had its natural resistance broken down, doubtless by some product of metabolism formed during the growth of the cancer. The cancerous cells are simply implanted on the new raw surface, whose resistance against these cells has been destroyed, and they grow rapidly. In practically all cases that have become extensive, the roentgen ray or radium has been tried and has failed, so but little can be expected from this source.

The principles that appear to underlie the surgical treatment of extensive basal cell cancers demand, first of all, that the surface of the cancer be destroyed and sealed by cautery so that transplantation of cancer cells will be avoided; secondly, that the excision be done as far as possible with the electric cautery and

the raw surface be further cauterized after the excision has been completed, and, thirdly, that the raw surface be covered as soon as possible by tissue from a distance, where the normal resistance to cells from a basal cell cancer has not been destroyed.

I have had four cases of extensive basal cell cancer which seem to illustrate this principle. In each of these the cancer was removed, and a flap from a distant part was transplanted as soon as possible. In three of these there was a complete cure. In the fourth case the basal cell cancer recurred and the patient eventually died. This, however, was the strongest proof of this theory, because the cancer had invaded the antrum, and the flap was so transplanted that the skin surface was opposite a portion of the raw surface from which the cancer was removed. Too much of an effort was made to produce a cosmetic result. The carcinoma recurred at no point where the raw surface of the graft was in contact with the raw surface left by the removal of the cancer, although there was extensive recurrence where the skin surface of the flap was apposed to the raw surface of the ulcer for in such areas there could be no inhibitory effect of the raw transplanted tissue.

It seems logical to conclude, therefore, that in extensive basal cell cancers, in addition to cauterization and excision with a cautery, an important principle is to apply as soon as possible, to the raw surface from which the cancer was excised, the raw surface of a pedunculated flap transplanted from a distance. It was formerly thought that plastic operations for defects caused by the extirpation of cancer should not be done until it had been determined, after the lapse of months or of years, that there would probably be no recurrence. The idea seems to have prevailed that it would be useless to transplant a flap when cancer might recur beneath it. With basal cell cancer, however, this practice appears to be erroneous, and a flap from a distance should be applied as soon as possible after the excision of the cancer, for the flap seems to add an additional obstacle to the growth of the cancer by interposing its own natural resistance to the cancer cells.

TRANSPLANTATION OF ORGANS.

Skin grafting and transplantation of organs or tissues are dependent on biologic laws. Surgeons who have had great experience in this type of work, such as Lexer and Davis, believe that skin grafts from others than the

patient are practically never permanent. They either melt away at once or, if they appear to "take," are later absorbed and replaced by connective tissue. It has been suggested that tests, as for transfusion of blood, would be of benefit in selecting a donor for skin grafting; but so far this has not been put to any extensive practice. The transplantation of highly developed organs, such as a kidney, from one animal to another, even if of the same species, is always a failure. The kidney may function for a while, but the fine biologic differences in the body fluids of the donor and the recipient cause degeneration, and the kidney eventually becomes a mass of connective tissue. This has been acknowledged by Carrel, Guthrie and others who were at one time enthusiastic about the success of such a procedure. The reconstruction of channels, as the bile ducts, from tissues that have no immunity to the irritating discharges with which they must come in contact is also unwise. Operations in which strips of fascia, pieces of vein, and other tissue unaccustomed to the action of bile are used, ultimately result in failure, no matter how skilfully the mechanical part of the operation is done. There must be some natural biologic resistance to irritating discharges by the tissues in normal contact with these discharges.

These are merely a few instances of what every surgeon sees in his work, and they illustrate the profound influence that the application of biologic principles has on surgical practice. Real progress in surgery lies not so much in cultivating the art of surgery and in striving after mechanical dexterity, which is important, but can be acquired in a few years, as in the study of biologic principles that concern function, nutrition, metabolism, and repair of tissues, and in the thoughtful application of these principles to every operation and to every method of surgical treatment.

It seems to be the duty of every disciple of medicine and surgery not only to apply biologic principles in his daily work, but to record instances in which new applications can be made. A study of nature nowhere offers a greater field than in the practice of medicine and surgery. Biologic processes are constantly before us, and their proper interpretation and application to our problems is not only a duty, but a great privilege. A discoverer of a new truth, be he ever so humble, is a great benefactor of science.

St. Elizabeth's Hospital.

THE RELATIONSHIP OF THE EYE TO GENERAL DISEASES.*

By G. B. DUDLEY, JR., M. D., Martinsville, Va.

Before beginning the relationship of the eye to general diseases, let us briefly consider the innervation of the eye, as on this anatomical arrangement depends to a large extent much ocular pathology produced by intracranial diseases and injuries.

The two optic tracts originate in the primary optic ganglia, viz., the anterior corpora quadrigemina, the external geniculate bodies, and the pulvinar of the optic thalamus, (these as you know are portions of the midbrain, and the midbrain lies in the opening of the tentorium cerebelli, and connects the pons with the hemispheres), wind around the crura cerebri, and the optic tracts terminate in the optic chiasm, which lies in the optic groove of the sphenoid bone, in the front of the infundibulum and above the pituitary body. There the optic tracts semidecussate and form the optic nerves, which continue through the optic foramina of the lesser wings of the sphenoid bone. The optic nerve has three divisions: first, the intracranial portion between the optic foramen and the chiasm; second, the orbital portion extending from the eyeball to the optic foramen; and third, the intraocular portion, which is the head of the optic nerve. The nerve pierces the sclera and choroid a little to the inner side of the posterior portion of the eyeball, and the sheaths of the nerve become continuous with outer layers of the sclera.

By this decussation of the optic nerve fibres at the optic chiasm, it is easy to understand how in various intracranial lesions, tumors, injuries, etc., we get our various hemianopsias, by which term we mean a blindness of one-half of the field of vision. For instance, if we have a lesion of the right optic tract posterior to the chiasm, we have a blindness of the right halves of both retinæ and as a result the left halves of the fields of vision of both eyes will be lost. This is known as homonymous or lateral hemianopsia, and in this particular case the condition is called left homonymous hemianopsia. Therefore, a lesion on the cranial side of the chiasm and on the same side as the blind halves of the retinæ will produce an homonymous hemianopsia.

Bitemporal hemianopsia indicates a lesion through the chiasm, that is, the nasal halves of the retinæ are destroyed. Should a lesion attack each side of the chiasm we would have a binasal hemianopsia. Bitemporal and binasal hemianopsia are known as crossed hemianopsia in contrast to homonymous. Complete blindness in the eye is produced when the lesion is anterior to the chiasm.

The third cranial (oculomotor) nerve supplies all the extrinsic eye muscles, except the external rectus which is supplied by the sixth (abducens) and the superior oblique, which is supplied by the fourth (trochlear). These nerves all originate from the floor of the fourth ventricle.

The contracting fibres of the iris (sphincter pupillæ), are supplied by the third nerve, the dilating fibres (dilator pupillæ) are supplied by the sympathetic. Hence, a contraction of the pupil is either caused by a stimulation of the third nerve or by a paralysis of the sympathetic, and a dilatation follows paralysis of the third nerve or stimulation of the sympathetic.

We shall now discuss the individual diseases of the brain. In *cerebral hemorrhage* we frequently find homonymous hemianopsia, mydriasis due to paralysis of the third nerve supplying the sphincter pupillæ, neuritis or choked disc, with or without retinal changes, and sometimes later an optic atrophy.

An *embolus* or *thrombus* produces the same symptoms in general as a hemorrhage and often is hard to distinguish from the latter. In a *thrombosis* of the *cavernous sinus*, edema of the lids, exophthalmus, dilated pupils, blindness, loss of sensation of the eye, etc., may result. The marked stasis of the retinal veins will distinguish this condition from meningitis, which may cause some venous congestion and a neuritis.

Tumors and *abscesses of the brain* present practically the same ocular symptoms, that is, choked disc, paralysis of various ocular muscles, mydriasis, etc. Ocular changes are invariably present in tumors and other diseases of the *pituitary* body, of which we hear so much today in the various discussions of endocrinology. Bilateral hemianopsia is frequently seen in tumors of this gland, also other ocular paralysis and symptoms of optic nerve pressure.

In *meningitis* we may have optic neuritis in

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every stage from a simple congestion to a choked disc or atrophy, as well as various muscular paralyses.

In *encephalitis lethargica*, which we may classify as a brain condition, and of which we saw something during and succeeding the last war, the chief ocular symptoms are diplopia, ptosis, impaired accommodation, nystagmus, sluggish pupils, optic neuritis and choked disc.

In *paralysis agitans* (*Parkinson's disease*), we frequently see incomplete unit or bi-lateral ptosis, crossed diplopia for near and rarely gray atrophy of the optic nerve or nystagmus. Not long since, a patient (an old gentleman who lived in Schoolfield), with paralysis agitans, came under my observation, with a gray atrophy of the optic nerve.

Eye symptoms are highly important in *dementia paralytica* (*paresis*). There is usually a simple gray atrophy of the optic nerve with narrowing of the vision field, eventually terminating in blindness. This is usually a late symptom of paresis, but it may occur at an early period or even precede the mental disturbance. Ocular paralyses of central origin are very frequent, including the Argyll-Robertson pupil phenomenon. Pupils may be contracted, dilated or unequal.

The eye is often affected in *multiple* or *disseminated sclerosis*. From the general picture of the disease, and the ocular examination, I have seen oculists unhesitatingly make a correct diagnosis of the disease. With the characteristic intention tremor, scanning speech and limb paralyses, a nystagmus and primary optic atrophy leave little else to be desired in making a diagnosis of this condition.

Diseases of the spinal cord give rise to eye symptoms only when the region of the cilio-spinal centre is affected, directly or indirectly. Other eye symptoms occur when the disease of the cord extends to the cranial cavity or in case of complications.

Tabs Dorsalis furnishes ocular symptoms too well known for any lengthy discussion. The ocular symptoms are frequently the first noticed. Primary optic atrophy, with disturbances of vision and muscle paralyses, are the chief symptoms. The vast majority of optic nerve atrophies may be traced to syphilis, probably 70% to 90%. Nystagmus is rare. Ptosis not so rare.

In injuries of the spine, as "Railway Spine," we some times get various eye symptoms.

Under functional *psycho-neuroses* we may discuss *hysteria*, *neurasthenia*, and *epilepsy*. Unilateral diminution of vision, frequently with complete blindness, is the most usual ocular symptom of hysteria. The vision field may be contracted and the color fields reversed (i. e., green the largest, red next, and blue the smallest). Photophobia, blepharospasm, diplopia, ptosis and various anaesthesias and paraesthesias may exist. With the ophthalmoscope nothing is seen, and malingering must be excluded in making a diagnosis. The *neurasthenic* may have almost any kind of ocular complaint or pain. But we should not be too severe on this class of patients, for very frequently there is some refractive error at the root of the whole trouble, and with the proper glasses worn, the symptoms disappear.

A visual aura frequently marks the beginning of an *epileptic seizure*. During the attack the pupils are generally dilated, and there is often a spasm of the extrinsic eye muscles, with a rolling of the eyes. Frequently, epileptic-like attacks may be reduced by properly fitted glasses where refractive errors exist.

The most usual ocular symptom which we observe in *trifacial neuralgia* is the neuro-paralytic keratitis. This is a form of progressive infectious corneal ulcer which is somewhat peculiar. Many think that this is proof that special trophic fibres exist in the first branch of the trifacial nerve. In practically every case, certainly that I have seen, where the gasserian ganglion or its sensory root is extirpated, these corneal ulcers develop. Personally, I think that lack of the normal sensation in the cornea to protect it from foreign bodies and dust has as much or more to do with the formation of these ulcers as the destruction of the so-called trophic nerve fibres.

The ocular symptoms of *facial paralysis* are well known to all, viz., inability to close eye of affected side, drooping of lower lid and lachrymation.

Albuminuria is the term now generally employed in discussing kidney (Bright's) diseases, and as the retina is the part of the eye most affected by renal involvement, albuminuric retinitis is the pathological condition we describe. *Chronic interstitial nephritis* is the type most commonly responsible in retinitis albuminuria. Next in frequency is the *chronic*

parenchymatous type. Subjectively, there is a diminution or loss of vision without pain, as a rule. Objectively, albuminuric retinitis is characterized by the presence of white or yellowish spots in the retina, hemorrhages, edema and blurring of the outline of the disc. These changes occupy particularly the region surrounding the disc. The white spots may coalesce, forming large irregular patches. The so-called typical picture includes the stellate figure at the macula, which consists of radiating white lines and spots, with the fovea centralis for the center. This figure, however, is often missing and must not be considered essential for a diagnosis. The ability to recognize the minute changes that occur early in the course of the renal disturbance is of far more value than distinguishing the retinal lesions themselves, as the cases are usually far advanced when true retinal changes have occurred. Here we have changes in the vascular tunics similar to those occurring in arteriosclerosis, which we will discuss in a few moments. The external puffiness of the eyelids is too well distinguished to require other than mentioning. The *albuminuria of pregnancy, uremia, eclampsia, and scarlet fever* present the same picture as above described.

In *diseases of the Blood and Circulatory system* we shall first discuss *Arteriosclerosis*. Among the early evidences of arteriosclerosis in the retina are great tortuosity of the small arterial twigs, irregularity in the calibre of the vessels, narrowing of the arteries, loss of transparency of the vessel walls, hyperemia of the nerve head and flattening or indentation of the veins where crossed by arteries. Among the later changes are included hemorrhages into the retina, occlusion of the central retinal artery, thrombosis of the central retinal vein or its branches, and perivasculitis, which manifests itself as white lines bordering the vessels. Hemorrhages into the retina due to arteriosclerosis are of prognostic significance; they are followed by cerebral apoplexy in more than 50% of the cases. Thrombosis of the central retinal vein or its branches has a like prognosis.

Valvular heart disease and fatty heart are often accompanied by hemorrhages into the retina, less frequently into the vitreous. *Aortic insufficiency* may cause pulsation of the central artery of the retina. *Endocarditis* may cause embolism of central artery of

retina. The edema caused by cardiac disease may involve the eyelids.

Aneurysm of the Aorta frequently affects the eyes, viz., mydriasis, exophthalmos and enlarged palpebral aperture due to the irritation of cervical sympathetic, or miosis and endophthalmos due to paralysis of sympathetic. This may also cause thrombosis or embolism of the central retinal artery or one of its branches.

In *Simple Anemia* and *Chlorosis* we usually find pale conjunctivae and pearly white sclerae. The fundus and disc may be pale as well as the retinal vessels. Occasionally, retinal hemorrhages are found. *Pernicious Anemia* often causes retinal hemorrhages, and the fundus is very pale. *Hemophilia* predisposes to profuse hemorrhage after injury to the eye.

In *Leukemia*, retinal hemorrhages are common, the vessels are greatly dilated and tortuous, the fundus is pale red with a yellowish tinge, and there are white and yellow spots of exudation.

Purpura is frequently accompanied by hemorrhage beneath the conjunctiva, in the retina, skin of the lids and occasionally into the orbit.

Severe hemorrhage may be accompanied by amblyopia, either temporary and accompanied by little or no ophthalmoscopic change, or permanent and followed by optic nerve atrophy. Such sudden and severe anemia may cause retinal hemorrhages.

Under the acute infectious diseases we shall first consider the diseases of childhood. Some variety of conjunctivitis usually accompanies *Scarlet Fever, Measles, Diphtheria, Whooping-Cough* and *Mumps*. During *Scarlet Fever* an albuminuric retinitis or an uremic amaurosis may suddenly develop. Optic neuritis, orbital cellulitis, choroiditis, and corneal ulcers are very rare complications of scarlet fever. Rarely in *Measles* does the conjunctiva take on a blennorrhoeal or diphtheritic aspect and then the cornea is in danger of ulcer formation. Muscular paralysis in the latter part of the disease, or often weeks later, is the most usual complication of *diphtheria*. Paralysis of the intrinsic muscles is by far the most common, but extrinsic muscle paralysees are not unusual. In *Mumps*, edema of the lids may occur; optic neuritis, iritis and ocular paralysees have occasionally occurred. In *Whooping-Cough*,

conjunctivitis and epiphora are common in the prodromal stage. In the convulsive stage, extensive hemorrhages, due to violent coughing, may develop.

Before vaccination was introduced, much blindness was produced by *Smallpox*. The lids and conjunctivae are often the site of pustules, and keratitis and corneal ulcers frequently develop; the ulcers frequently perforate, producing as sequelae, opacities, adherent leukoma, and even destruction of the globe.

In *Typhoid* and *Typhus Fevers* rarely there may be catarrhal conjunctivitis, ulcers of the cornea, and retinal hemorrhages. Paresis of accommodation and of the extraocular muscles may develop during convalescence.

In *Tuberculosis* we may have conjunctivitis, blepharitis, phlyctenular conjunctivitis, keratitis, interstitial keratitis, and, at times, involvement of the iris, choroid and sclera.

Gonorrheal ophthalmia and *ophthalmia neonatorum* are too well known ocular infections caused by "The Neisser Brothers" to require other than mention. Corneal ulcers, with or without perforation, may result, leading to incarceration of the iris, staphyloma, panophthalmitis, etc.

Syphilis frequently causes ocular diseases. Rarely the primary sore may occur on the lids or conjunctiva. About 35% of iritis is due to syphilis, being an early symptom of the secondary stage. Later in this stage choroiditis, chorioretinitis, optic neuritis and vitreous opacity may develop. In the tertiary stage, gumma may develop, also optic neuritis, optic atrophy and sometimes interstitial keratitis. Congenital syphilis is largely responsible for interstitial keratitis and some congenital ocular defects. As *tabes dorsalis* and paresis are of luetic origin, the ocular pathology discussed under them, of course, may be said to be manifestations of syphilis.

Malaria may produce a keratitis, optic neuritis, retrobulbar neuritis, hemorrhages into the retina and vitreous, amblyopia and paresis of accommodation.

Erysipelas may cause great swelling and edema of the eyelids; following this there may be an abscess of the eyelids or an orbital cellulitis. Sometimes thrombosis of the retinal veins, optic neuritis, or atrophy of the optic nerve may follow. Several years ago, I saw a case complicated by an orbital cellulitis and

abscess, which in turn was complicated by a meningitis, and death resulted.

During the past few years *Influenza* has been much in the limelight. It is practically always accompanied by a congestion of the conjunctiva or by an acute catarrhal conjunctivitis. Frequently there is severe pain in and back of the eye balls. Rarely there may be corneal ulcers, paresis of extrinsic ocular muscles, retrobulbar neuritis, neuroretinitis, optic nerve atrophy and orbital cellulitis. The extreme depression following the disease probably accounts for many of the ocular complaints credited to the disease itself.

The edema of the eyelids, which often appears at the very beginning, frequently aids in diagnosing a case of *Trichinosis*. In only severe cases does the trichina spiralis emigrate into the external eye muscles.

Cataract and retinal hemorrhages are the most usual ocular complications of *Diabetes*. Less often we may find retinitis, optic neuritis, retrobulbar neuritis, iritis, ocular paralyses, and broken down vitreous conditions.

Rheumatism may be ascribed as the cause of some cases of iritis and iridocyclitis.

Rickets often causes congenital (Zonular) cataracts, interstitial keratitis and phlyctenular kerato-conjunctivitis.

Scurvy most frequently causes an exophthalmos due to hemorrhage into the orbit. This occurs in about 10% of cases. Subconjunctival and retinal hemorrhages occur at times.

The various ocular symptoms and signs of *Exophthalmic Goitre* (*Graves' or Basedow's Disease*) are probably well known to all. Varying degrees of exophthalmos are usually present. Von Graefe's sign (lagging of upper lid when looking down), Dalrymple's sign (abnormal widening of palpebral aperture), Stellwag's sign (diminution in power of normal involuntary winking), Moebius' sign (imperfect power of convergence), Gifford's sign (difficulty in everting upper lid), are all due to and produced by the exophthalmos. The cornea may suffer when the exophthalmos is extreme, and epiphora is common.

Space and time forbid me to discuss the effects of many drugs and poisons on the eye. *Quinine* in large doses, or occasionally with moderate doses in susceptible individuals, may produce more or less complete blindness, often noticed suddenly, contracted visual fields, dilated pupils, and marked pallor of the disc,

with extreme contraction of the retinal vessels.

Since the so-called prohibition went into effect *methyl-alcohol amblyopia or amaurosis*, resulting from the drinking of cheap whiskeys, "moonshine," "hootch," "monkey-rum," "corn," cordials, essences, and other alcoholic beverages, is quite frequently seen and read in the daily papers. Wood alcohol is a protoplasmic poison, possessing a selective affinity for the delicate nerve tissues of the eye. Sudden blindness with vomiting and abdominal pain should arouse suspicion of methyl poisoning; especially if diplopia or ptosis are associated. The ophthalmoscopic appearances are hyperaemia of disc with blurring of edges and later atrophy of the optic nerve with small retinal vessels.

Diseases of the *Accessory Sinuses (maxillary, ethmoid, sphenoid and frontal)* are frequently responsible for many ocular symptoms and diseases, among which are orbital cellulitis, exophthalmos, paralysis of ocular muscles, asthenopia, reduction in acuteness of vision, changes in fields of vision, optic neuritis, retrobulbar neuritis, atrophy of optic nerve, corneal ulcers, keratitis and iritis.

The "innocent" *facial tonsils* frequently produce ocular troubles, especially conjunctivitis, keratitis and iritis.

Bad teeth are frequently responsible for much ocular pathology, especially keratitis, corneal ulcers and iritis. The subject of accessory sinus diseases, tonsils and teeth as factors in eye pathology would require a paper alone and our time only permits mentioning them.

In this paper, I have by no means covered the relationship of the eye to all general diseases, but I have tried to select the most usual ones met with in the practice of general medicine.

PLANNING A HOSPITAL IN A CHINESE CITY.*

By CLAUDE M. LEE, M. D., St. Andrew's Hospital, Wusih, China.

There are many here today who remember the difficulties encountered in founding and carrying on the University Hospital. Picture to yourselves these difficulties, plus those which are added to such an enterprise by its being undertaken in a distant land, the work to be

done through the medium of a strange tongue. Stand by my operating table with me and hear me say: "*Tau. Yeu ngo-ts kuh kyien. Pih zeh kuh makken kyien. Bing li-hyang kuh sien, ih au.*" Which means: "Knife. Toothed forceps. Straight clamps. Plain catgut, No. 1." Think of the agony of wanting these things and forgetting their names in Chinese. And think of the time it took before these orders came out as easily in Chinese as in English.

Having got you into what is, I hope, a sympathetic frame of mind, I am now going to tell you where St. Andrew's Hospital is. It is in Wusih. Wusih is a cocoon raising centre, with large manufacturing interests, situated on the Shanghai-Nanking Railway about half way between these well known cities.

The country around Wusih is an alluvial plain, intersected by very numerous canals. The canals are so close together that on the narrow foot paths between the fields, bridges occur several to the mile. These canals are the roads of this part of China and all are tributaries of the Grand Canal of China, one of the world's most famous waterways. This abundant water supply is vital to the farmers. Rice fields lie between the mulberry groves and these two divide the countryside with the last resting places of the mortal remains of those Chinese who have passed on. The striking features of the landscape, then, are the flat rice fields, green and damp looking; the stunted mulberry trees which are cut back each summer to get the leaves for feeding the silk worms; the canals which are at once the roads, the water works, and the sewers of the populace; and the nodular grave-mounds, which must never be disturbed.

The city of Wusih stands surrounded by a ring of factory chimneys. There are silk mills, cotton mills, flour mills and oil mills, the latter the most deadly of all to the hands of the laborers. The machinery in all these mills is of foreign make, the laborers are men, women, and children. There are no child labor laws in China and in the silk mills conditions are fearful. The hours are from five a. m. to seven p. m., with half an hour out for eating, or a fourteen hour day. The laborers, most of whom are children, work in rooms full of small vats of warm water in which the cocoons are flung to soften the fibre so that

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they may be reeled. The children must reach up to put the cocoons into the vats. A man with a split bamboo whip walks up and down between the rows of children to keep them at work. He does not hesitate to use his whip.

If you lump the census figures of Roanoke, Lynchburg, and Charlottesville, you have approximately the population of Wusih. The trading population, or those whose business makes this city their "base," amounts to probably 500,000 people.

The climate is about like that of North Carolina along the coast, damp and hot in summer and damp and cold in winter. Probably twice as much rain falls in our neighborhood as falls annually in Albemarle County. This damp hot climate makes central China an ideal home for tuberculosis, malaria, and hookworm. Venereal diseases are very much on the increase. If the pallid spirochete originated in China—and many scholars think it did so—the people showed a great immunity to their home strain. But after part of the family had taken a tour of the world, lasting for centuries, and returned to China by the seaports, luetic infections took on a new virulence.

The valley of the Yang-Tze River is probably the greatest hot-bed of tuberculosis in the world. There are thousands of deaths each year from pulmonary tuberculosis, and the other forms are very abundant.

The rice fields, stagnant pools, myriads of receptacles for night soil, which is one of the most prized commodities of the land, in fact all fishless water, give harbor to myriads of mosquitoes. Malaria carriers infect the mosquitoes, who in turn help the good parasite on its way. The common type of malaria is quartan, but there are epidemics of tertian and estivo-autumnal fevers which are veritable scourges.

Hookworm infests the intestines of eighty per cent. of the farmers. The primary infection through the skin, a cough with possibly some hemoptysis, a period of indigestion, and in about two weeks anaemia and loss of strength, make a clinical picture very familiar to the people of Wusih. They call the disease "The Mulberry Leaf Anaemia" from the fact that it chiefly comes on them in the summer, when heat and moisture have made hookworm larvae very comfortable under the shade of the mulberry groves. Men, women, and children repair to the fields for leaves and, as the

ground under the trees is kept aromatic with freshly applied night soil, they all get ankylostomiasis. Massive infections are seen and, owing to the branches of the trees being dragged on the damp ground and then hoisted to the bare back, the characteristic skin lesion is seen there too. We have seen such severe infections that the dyspnoea was bad enough to threaten life.

Epidemics of cholera, diphtheria, meningitis, and malignant malaria are occasionally encountered. In one epidemic of cholera we treated over six hundred cases in a little over a month. More than 2,500 cases of diphtheria have been treated in the out-patient department of St. Andrew's Hospital. An epidemic of cerebrospinal meningitis ran to about 120 cases before it stopped itself. We estimate that there were nearly a thousand deaths from malignant malaria year before last in the district around Wusih. About forty per cent. of all the inhabitants of China have trachoma.

Surgery in China does not differ very much from surgery in any other new territory. There are numbers of neglected cases, which are more common, possibly, than in this country where modern surgery has been available for years. At St. Andrew's we try anything that comes along and are amazed at how many specialties we can invade with fairly good results.

But we must get along to the actual starting point of this hospital. The out-patient department was opened in March, 1908. The first year's work saw us take care of 27,500 visits from patients, out-calls, etc. There was a small operating room in the building we had put up for this out-patient work and I well remember the first operation in it. We were engaged in taking off a small epithelioma from an old gentleman's eyelid when he suddenly went bad from the anaesthetic. I doubt if any of you can appreciate the horror of that moment. Like the man in the medical school who was asked what he would do in a certain emergency, I certainly did want to send for a doctor; but there was not one in town at the moment. However, the old man came around and all was well.

Our first in-patients were kept on boats on the canal in front of the dispensary. One or two cataracts were successfully done, the patients being obliged to disembark for dressings and inspection of the eyes. Boats are not a

good way to house surgical cases, however. They really leave much to be desired as hospitals when they are only twelve or fourteen feet long and have a whole family aboard, as well as the sick one.

There was one woman cared for who had lost her scalp. She was standing on the deck of her boat using bad language at a fellow boatman, when an anchor swung at a big boat's bow caught her on the forehead with one of its flukes. The scalp peeled back much like the skin of a very ripe peach does when a thumb is judiciously pressed upon it. Her scalp, completely torn off, was sutured into place and the boat moored in front of St. Andrew's dispensary. She got along pretty well until the third day when she suddenly tried to jump overboard. It was found that a three month's fetus had been lost and the woman went plumb crazy. Puerperal insanity can not be treated very well on a small boat.

Then five beds were put in a Chinese house centuries old and we felt that we had arrived. We had a hospital on land. In spite of considerable pride in this achievement, we kept going until we got a larger house also of Chinese construction, into which we put twenty beds. Our next step forward gave us a very nice building of foreign construction, of a capacity of fifty-five beds. In the last year we built an operating room which compares in convenience and sanitary conditions very favorably with the average in this country. We have a series of rooms consisting of anaesthetic, scrub room, sterilizing room, and operating room, all with steam heat and with running hot and cold water laid on. Across a corridor in this building are the offices and X-ray department. All the wards, the offices, the furnace room, and the various departments and residences are connected by telephone. We have our own private exchange. For out-calls two motor boats are kept in commission. Where there are no roads a motor boat is the equivalent of an automobile. The water supply is owned by the hospital and consists of an artesian well and pumping plant. The well supplies us with 8,000 gallons in twenty-four hours, though at present we are using only a fourth of that amount. The water is pumped to a tower and distributed to the different buildings by gravity.

There are five residences in connection with

the hospital for the staff, besides buildings for the servants, laundry, and stores. The staff consists of two foreign doctors and four Chinese doctors, two foreign trained nurses and fifteen Chinese graduate and pupil nurses, a chaplain and a foreign social service worker, as well as numerous attendants. The outpatient department maintains a branch dispensary about two miles away in a populous mill district which is a new and growing part of the town. Daily clinics are held in the outpatient department. There is one free day each week which is much appreciated, for there were nearly 10,000 visits to this clinic last year.

The mere recital of physical equipment does not give any idea of the intense human interest in a venture of this kind. Cut off from professional association in large measure, and without the possibility of consultation, there is a great strain to be borne always—first, a strain from responsibility, and second, a strain on the conscience, to keep a man from letting down on asepsis, and on good careful work.

There are adventures from time to time which enliven things. Let me pause to classify some of them and give examples of each kind. There are social, physical, and professional adventures. In a social way things in China are very different from things over here. Have you ever heard of the ancient eggs of Chinese feasts? A young man went out to Wusih from Charlottesville. He was invited to a feast, given by some Chinese gentlemen. Buried eggs which had been recovered as the result of excavations were served. These eggs are buried in lime and when exhumed the meat has a distinctly cyanotic color. Chinese officials of the old regime used to let their nails grow long to show they never had done any manual labor. One old gentleman at this feast had a long black claw on his little finger which had on its under surface a specimen of everything he had ever eaten since childhood. He sliced a bit of egg with this nail. He speared the slice with that same horrid nail and offered it to the pale young American. That young hero, this is not a personal narrative, though I know it to be true, took the egg and ate it all. It stayed down. This young man never got the medal his conduct deserved.

For obvious reasons one does not give personal narratives of physical adventure. But I knew a man in China who had all his clothes

taken away from him by rapacious bandits when he was miles from home and blown upon by an icy night wind in mid-winter.

It is something of a professional adventure to have a patient for whom you are harmlessly changing a surgical dressing expire, when you are a long way from your friends and surrounded by his friends. Yet, I know a man to whom this happened. He was dressing a carbuncle, which was doing beautifully, but the patient suddenly died. The Greeks had a pleasant custom under certain circumstances of chaining a living man to a corpse. Just exactly this procedure was proposed, the great doors of the Chinese house were shut and clamor arose and horrible pandemonium. The doctor escaped, but he was thoroughly frightened. It is an interesting thing to work in a Chinese city.

In closing, I am going to ask a question. What is to be the fate of a foreign hospital in a Chinese city? We hope that St. Andrew's Hospital will ultimately become the City Hospital of Wusih—under Chinese management entirely and under Christian management, if possible. With the return of numerous students of medicine from abroad, with the graduation of still more numerous students from real medical schools in China, it seems to me that ten or twenty years will see mission hospitals largely turned over to the Chinese and the work taken out of foreign hands.

PHLYCTENULAR KERATO-CONJUNCTIVITIS.

By SIDNEY TRATTNER, M. D., Richmond, Va.

This paper is a review of the literature on phlyctenular kerato-conjunctivitis, with regard to etiology only. It might seem that this is a timeworn subject, but it is surprising to see how little has been written on this condition in the past few years. What is still more surprising is that in spite of excellent authority and emphatic statements in favor of one theory of causation or another, the etiology is still a matter of dispute. Men whose opinion is to be respected, are ranged for and against every factor indicated, and it was this that suggested that a review of these opinions might show where the greatest weight of authority rested.

To indicate what conflicting views there are

as to the origin of this condition, the following list will be of interest. At various times these causes have been assigned to phlyctenule: Exposure to wind, dust, bad living conditions, anemia, poor health, intestinal derangements, pediculosis, errors of refraction, auto-intoxication, eczema, various bacteria, scrofula, the exudative diathesis, tonsil and adenoid conditions, nasal conditions, herpes, anaphylaxis, and a derangement of carbohydrate metabolism.

Of these, tuberculosis, the exudative diathesis, eczema, scrofula and faulty digestion and metabolism have received the most attention. Probably the earliest observations were those which noted the frequent occurrence of phlyctenule with the condition known as scrofula. The name conjunctivitis externa scrofulosa was given it as long ago as 1813, by Beer. Later investigators agreed with this, although Mackenzie in 1833, while regarding the scrofulous condition as being the chief predisposing factor, thought that remote causes operated in the production of the disease.

Since then opinions have been conflicting, and the long list of causes ascribed to phlyctenule is evidence of how obscure the basis of this condition is. However, these divergent views may be roughly classified into two groups for the purposes of this paper: the first, those which ascribe the cause to tuberculosis, and the second, those which ascribe it to other factors.

Considering first the non-tuberculous theories that have been discussed in the literature since 1910, we meet with the following:

Colombo in 1911, did some work with the object of proving that phlyctenule was the result of gastro-intestinal disturbance. His method was to determine the amount of indicanuria in his cases, and he found that in one series forty-two out of forty-three had indican. A later series showed somewhat the same findings. However, it was afterwards shown by von Hippel and others that in phlyctenular disease indicanuria was no more frequent than in other eye conditions, or for that matter in conditions elsewhere in the body. More recent experiments in metabolism have shown that the degree of indicanuria is no gauge of intestinal toxemia. However, other observers have noted that gastro-intestinal disturbances are by no means a constant factor in cases of phlyctenular ophthalmia. In ninety-two cases

*Read at the November meeting of the Richmond Society of Ophthalmology and Oto-Laryngology.

studied, W. S. Gibson found only nineteen in which there was any evidence of derangement of the gastro-intestinal tract.

Will Walter (*J. A. M. A.* Sept. 1913) wrote that the theory of bacterial infection was not proven; that the malnutrition and auto-intoxication theory was important and fundamental; but that neither of these factors was the specific cause. He stated that the endogenous infection theory considered latent tuberculosis as the most probable cause, and concluded by saying that the part played by a possible anaphylaxis was to be considered.

Another adherent to the auto-intoxication theory was H. D. Bruns, who in 1912 stated that he believed the condition to be a neuropathic one, depending on auto-intoxication and gastro-intestinal disturbances.

In a later discussion Bruns said that he favored a neuropathic origin following some shock, disturbance of metabolism or gastro-intestinal disturbance. He likened the lesions to herpes and stated that they occurred in the nerve-ends. He quoted I. Dyer, a pathologist, to the same effect.

Samuel Theobald (*A. M. A.* Aug. 1914) stated that the evidence in support of a tuberculosis or pseudo-tuberculosis origin was far from convincing. The almost constant association of facial eczema with the ocular inflammation showed that it was an ocular eczema.

Hunter H. Turner, discussing the question in 1917, said that faulty carbohydrate metabolism could not explain the variations in phlyctenulosis. He thought the condition due to a chronic low-grade ethmoiditis with obstruction to drainage.

M. Goldenburg, in the Section on Ophthalmology 1917, read a paper in which his conclusions were as follows:

1. Ophthalmia eczematosa, or phlyctenular disease, is not a true pathologic entity, but a symptomatic manifestation of a systematic disturbance.

2. Tuberculosis, syphilis and sepsis can be excluded with certainty as causal factors.

3. Phlyctenular disease is in all probability one of the expressions of a vagus system irritability produced by some toxic agent resulting from carbohydrate chemism.

4. Correction of the chemism by a carbohydrate-free diet and control of the vagus hypertonia through the topical and internal

use of atropine yield the best and quickest possible therapeutic results.

These conclusions were arrived at as the result of the study of five hundred cases covering a period of seven years.

Duane, in his translation of Fuchs, writes, "In any event it seems clear that the relationship of this disease to tuberculosis is at most an indirect one. The results of treatment point to some other contributory or perhaps essential cause (disturbance of metabolism due to gastro-intestinal toxemia, pharyngeal and tonsillar infection, etc.)" Further on he writes, "Sweets, especially candy, cakes, pies and pastry of all kinds should be forbidden, and only very plain but substantial food allowed. It would seem that regulation of the diet alone may do a great deal toward effecting a cure in these cases."

A number of writers on the subject are neither for or against tuberculosis, but include it as one of a variety of causes.

Lafon divided the cases into three classes etiologically:

1. Tuberculous.
2. Following the exanthemata.
3. Gastro-intestinal and naso-pharyngeal.

Schuetz and Videky classified according to therapeutic results and found two groups:

1. Tuberculous, and cured by tuberculin.
2. Exudative, and cured by a diet free from sugar and eggs, and with little meat.

Oskar Everbush in his text-book on Diseases of the Eye in Childhood says: "Particularly are children of the scrofulo-lymphatic habitus attacked by conjunctivitis phlyctenulosa.

"Catarrhal conjunctivitis, the acute exanthemata, skin eruptions such as eczema, intertrigo, prurigo, urticaria, various forms of blepharitis, eczematous eruptions of the skin of the face, pediculosis capitis, and general uncleanness are etiologically of significance. In phlyctena in non-tuberculous children 'Lymphatism,' 'Oxypathy,' or the 'Exudative Diathesis' following a diet with excess of fat producing foods or an intestinal auto-intoxication, are the bases, following which the tissues of the conjunctiva and cornea of these children are strongly susceptible to infection through their great sensitivity to bacterial proteins, particularly when resistance has been lessened as the result of a previous tuberculous infection."

Roemer in his Greifswald lectures published in 1913, says: "Although a certain connection exists, scrofulosis is not necessarily the only cause of kerato-conjunctivitis eczematosa. All scrofulous children do not suffer from this disease, and, on the other hand, we meet with cases in which positive signs of scrofulosis cannot be demonstrated, even though it cannot be excluded. . . . All that we can say as yet is, that in the majority of cases the scrofulous diathesis predisposes to this disease." Discussing the theory of endogenous infection he says, "In the first place no micro-organism yet known to us can be found within the fresh efflorescences on microscopical examination (Axenfeld, Wagenmann, Hertel, L. Mueller and others). Cultures likewise fail to detect ordinary bacteria in these nodes. Dead tubercle bacilli are not to be found in them. In the second place Leber and others have demonstrated that the inoculation of fresh efflorescences into the anterior chamber of rabbits excites no inflammation. In the third place the giant cells occasionally found in the efflorescences are not evidence of a tubercular origin especially as these cells are not of Langerhans' type. The evidence which has been brought forward does not convince me that kerato-conjunctivitis eczematosa is caused by an endogenous infection.

"I maintain on the contrary that an ectogenous origin must be granted before the disease can be understood. . . . The entire clinical picture of kerato-conjunctivitis eczematosa becomes comprehensible at once when we assume that a specific agent as yet unknown, but perhaps widespread, excites the discrete diseases on the surface of the eye, especially in persons with a scrofulous diathesis."

Fuchs in Duane's Sixth Edition states that phlyctenular disease has its origin in the scrofulous diathesis. Discussing the nature of the efflorescence he says that two things have to be kept in mind: "1. The efflorescences when quite recent are sterile, containing neither the ordinary pyogenic germs nor tubercle bacilli. Inoculation from them into a test animal does not lead to tuberculosis. Hence it cannot be assumed that, like other inflammations of the conjunctiva, they are referable to ectogenous infection, and as little are they to be regarded in the light of true tuberculous nodules.

"2. In a great number of patients with conjunctivitis eczematosa there are changes which

are certainly tuberculous. . . . But even in those patients who otherwise show no clinically demonstrable evidence of scrofula or tuberculosis the examination with tuberculin . . . proves with rare exceptions the presence of latent tuberculosis. . . . We should not be far out in explaining them (the efflorescences) as being due to the action of toxic substances, in the same way, as for example, nodules develop in tuberculous individuals after the rubbing of a tuberculin ointment into the skin (Moro)."

It will be noted that the only point upon which Fuchs and Roemer agree is the culpability of the scrofulous diathesis.

Everbush speaks of von Hoffman as having "first mentioned the connection between phlyctenular kerato-conjunctivitis, persistent eczema and inflammation of the lids, on the one hand, and, on the other, disease of the lacrimal passages, tonsillar disease and concretions, as well as the usefulness of treating the nose and throat in scrofulous children."

When we turn to the tuberculous theory we find a rather long, weighty list of names in support of it. In this connection it might be well to mention that there is no lack of opinion to the effect that scrofulosis always means tuberculosis, and that some who support the scrofulous theory might properly be regarded as supporting the tuberculous. The relation of scrofula and tuberculosis is still in dispute, so that this factor must remain unsettled. Many writers on the subject seem to believe that scrofula is a condition or habitus which predisposes to tuberculosis. A. Czerny, in 1913, in an attempt to straighten out the contradictory observation in this condition, named the predisposing habitus the "exudative diathesis" and taught that it was only when these cases became infected with tuberculosis that the term scrofula was applicable.

R. Hilbert (Sensburg, 1902) found in 100 cases of phlyctena, scrofulous glands in seventy-three, scrofulous eruption in twenty-two, and rachitis in five. He accordingly decided that the association with scrofula was not a coincident.

Leber contended that the phlyctenule was the result of substances from dead tubercle bacilli set free from caseous foci elsewhere in the body. He presented some experimental support. Later he injected dead tubercle bacilli into rabbits with the intention of pro-

ducing phlyctenules in that way, but had no success in this attempt.

O. Bruns, a pupil of Leber, repeated Leber's experiments with like results. He also tried to produce phlyctena by injecting tubercle bacilli into rabbits, but the result was a true ocular tuberculosis and not phlyctenular disease (*Archiv. f. Ophthalm.* 1904).

De Wecker was of the opinion that the condition was due to the toxin of the tubercle bacillus and thought that the phlyctenules were analogous to tuberculides of the skin.

Turien, writing in 1911, stated that "1. The tuberculous nature of conjunctivitis eczematosa is established and this opinion is supported by the results obtained in cases subjected to tuberculin both diagnostically and therapeutically, and by the majority of other essential findings. 2. The cutaneous diagnostic test of von Pirquet is a dependable method for recognizing tuberculosis, particularly in children. 3. Tuberculin as a therapeutic agent in the treatment of conjunctivitis eczematosa is an agent of distinct and special value."

The von Pirquet test and reactions following the use of tuberculin diagnostically and therapeutically figure largely in the attempts to establish the tuberculous etiology. Apparently few writers who oppose the tuberculous theory seem able to explain away these reactions. The only definite statement of that nature which I have seen is one by Geo. S. Derby, in the *J. A. M. A.* Sept., 1912, and that is a negative one. He said, "I have had considerable experience with tuberculin in the treatment of phlyctenulosis, and I feel doubtful whether any of these cases have been much benefited by it." However, elsewhere he says that though the tuberculosis theory was not proven, evidence showed that the incidence of phlyctenule has a relation to the incidence of tuberculosis.

Regarding the value of the von Pirquet test, statistics are interesting in this connection. In twelve series of cases by eleven investigators, the total number of cases of phlyctenulosis was 903. (Ayrenx, Bednarski, Belenky-Raskins, Bruns, Bywater, Davis and Vaugan, Derby, Pyfer, Rosenhauch, Tivnen, and Weekers.) Of these 769 gave positive tuberculin reactions, which is eighty-five per cent. The claim was then put forward that the percentage of positive reactions would probably be as

high in any group of individuals examined. Figures seem to deny this. In three series* investigated by three different men, totaling 1,806 children under six years of age, the percentage of positive von Pirquet reactions was eighteen and eight-tenths per cent. These children were taken at random. Whereas in three series of cases of phlyctena investigated by three different men (Belenky-Raskin, Weekers, Gibson), in a total of 118 children under six years of age, ninety per cent. gave positive reactions. This strongly suggests that there is some connection between phlyctena and a positive tuberculin reaction.

Belenky-Raskin (*Zeitschr. f. Augenheilk.* vol. 29, part 6) subjected 100 cases to the von Pirquet test and to the Moro test; ninety-two per cent. gave a positive von Pirquet and eighty-five per cent. a positive Moro reaction. He was convinced of the tuberculous nature of this disease.

The experimental production of phlyctenules has been reported by a number of men. In 1910 Rosenhauch (*Archiv. f. Ophthalm.*) introduced staphylococcus pyogenes aureus into the eyes of tuberculous rabbits and phlyctenular disease resulted. Introducing the staphylococci into the eyes of healthy animals did not produce this result. He also took healthy rabbits and injected them with tuberculin. Into the eyes of one series he introduced staphylococcus pyogenes aureus, and into the eyes of another series, toxin from the same organism. Phlyctena resulted in seventy per cent. of both series. He concluded that phlyctenular disease was the result of the combined action of the toxins of tubercle bacilli and some other organism.

Weekers produced phlyctenules by the instillation of old tuberculin into the conjunctival sac of tuberculous rabbits. He believed the condition due to the toxin of the tubercle bacillus, and did not consider other organisms played any part, as he achieved his results by the use of tuberculin only.

J. Rubert (*Klin. Monatsbl. f. Augenheilk.* Sept., 1912), in addition to the experiments of Rosenhauch and Weekers, tried various modifications of them. His results were somewhat contrary, and he came to the conclusion that phlyctenulosis is the result of metabolic action and that auto-intoxication and the exuda-

*Von Pirquet, Hamburger and Monti, and Veeder and Johnston.

tive diathesis cannot alone be blamed but must be accompanied by tuberculosis.

W. S. Gibson (*Amer. J. Dis. Child.*, Feb., 1918) produced phlyctenules eight times in tuberculous rabbits; six times following the injection of tuberculin into the conjunctival sac, and twice in the absence of any local irritation. He states that numerous attempts to produce the disease in non-tuberculous animals were unsuccessful.

In 1912, Davis and Vaugan reported forty cases in which tuberculin was used diagnostically and therapeutically. They decided that the results indicated the value of tuberculin.

S. Stephenson (*Lancet*, July, 1914) writes that from the similarity of findings of many observers the association between phlyctena and tubercle was proven on biologic and clinical grounds and could not be doubted.

Igersheimer was in favor of the tuberculous origin, but could not get away from the fact that some cases have no suspicion of tuberculosis at all.

F. H. Verhoeff thinks the disease is always due to tuberculosis clinically and by tuberculin tests. He believes the phlyctenule is an anaphylactic reaction and that the reason that some cases do not react to tuberculin is that they are at the time in a refractory state. A later test might prove positive in these instances.

A. C. Norman (*Hospital*, London, 1915) remarked that "Under tuberculin treatment the process of ulceration was arrested very much more quickly than by ordinary methods alone, and the resulting area of corneal opacity was correspondingly diminished. Another advantage is a remarkable freedom from relapse, but to insure this we find it necessary to give the full course of fourteen injections in all cases."

J. H. Elliot (*Trans. Nat. Assoc. for the Study and Prevent. of Tuberculosis*, 1916) says that "it has been our experience that every child that has phlyctena has given a tubercular reaction."

R. Tivnen, as the result of the study of fifty cases treated with tuberculin, 1917, believes the disease due to tuberculosis.

L. J. Goldbach (Sect. on Ophthal. 1917) sums up a report on the study of thirty-nine cases by saying "I am not claiming this manifestation as a certainty of tuberculosis, but that in a majority of cases, if we use all methods of

diagnosis we will find some evidence of symptoms that go with tuberculosis."

W. S. Gibson (*Am. J. Dis. Child.*, Feb., 1918), in the summary of a comprehensive article, says "Clinical observation on ninety-two cases of phlyctenular conjunctivitis revealed the presence of tuberculosis in ninety cases, as shown by a positive von Pirquet test. In the two giving a negative reaction the diagnosis was doubtful. No other condition, either local or general, could be found with sufficient frequency even to suggest any direct influence in producing the disease."

In a discussion following papers on phlyctenular disease before the Section on Ophthalmology, in 1917, H. W. Woodruff spoke against the tendency of trying to make one factor responsible for the production of this condition. He thought it was the result of a combination.

In summing up the evidence presented in the literature reviewed here, we find: In favor of:

Auto-Intoxication	2 men
Carb o-Hydrate metabolism disturbance	1 man
Eczema	1 man
Ethmoiditis	1 man
Ectogenons Infection	1 man
Scrofula	4 men
Tuberculosis	15 men
Tuberculosis, with reservations	4 men
Undecided	1 man
Variety of causes (any of a) ..	7 men

In addition to this two men enumerated above, while favoring some specific cause, believe that the condition may be an anaphylactic reaction. Many that give a multiple etiology include tuberculosis in their list.

Regarding the question from the standpoint of sheer numbers, it would seem to be settled beyond doubt in favor of tuberculosis. From the standpoint of authority and weight of argument, it is not as obviously decided in favor of tuberculosis as it might seem. This is a decision that cannot be presented in mathematical terms but must be left for the reason and judgment of the reader. The impression gained in reviewing the literature was that the tubercle bacillus was the most probable etiological factor discussed.

114 North Fifth Street.

AFTER CARE OF OBSTETRIC PATIENTS.*

By C. J. ANDREWS, M. D., F. A. C. S., Norfolk, Virginia.

A consideration of the after care of obstetrical patients leads us to consider at least the principal pathological conditions which may follow labor. Examination at the time of discharge will be expected to show the degree of injury to the perineum, cervix, uterine supports—evidence of subinvolution, infection of cervix, uterus, or adnexa, and mal-position, as well as general condition of patient.

The frequency of these conditions will depend to a large extent upon the degree of success with which the pregnancy, labor and puerperium have been conducted, but so far we know of no way of preventing these in all cases, and until we do this, we know that a certain number will have some of these conditions. Therefore, it seems difficult to avoid the conclusion that all cases should be examined before discharge, in order that the abnormal condition may be discovered, and suitable advice given.

My records of 200 discharge examinations, made from six weeks to three months after labor, showed that in 21 cases the perineum was in an unsatisfactory condition. About sixteen of this group were multiparae, with previous injuries: one a primipara, who had a rapid, easy labor, with only a mucous membrane tear. Two others had induced labor, and forceps for threatened eclampsia.

Recently, I have used the Potter method of ironing the perineum with considerable satisfaction, and only occasionally used the episiotomy. In the first 150 cases, episiotomy was used rather often in primiparae with good results. Practically all were delivered under deep anesthesia.

Primary repair of the perineum has been usually very satisfactory, but occasionally the stitches will break down. In a few such cases I have done a secondary repair after about ten days, while the patient was still in the hospital. The results have been good, except in one case the perineum was closed somewhat too effectually. In those cases which require operation later, they are advised of this fact, usually after the nursing period is completed.

The unhealed, infected cervix laceration is of great importance to the patient's future

health. It is the beginning of endocervicitis, which forms a focus of infection which may destroy the woman's health. Examination of the cervix, particularly, has a secondary function—that of testing the relative merits of various methods of delivery.

My observation has led me to believe that forceps delivery, with the head still in the cervix, has given the greatest number of injuries. Properly performed version gives less. Forceful delivery by any method when the cervix is not fully dilated is usually very difficult, and the cervix is exposed to considerable trauma, and often badly torn.

My records show that 17 in 200, or 8½%, private patients had evidence of cervical infection at time of discharge. Some of these more superficial erosions are improved by silver nitrate or iodine, or other local applications. If the cervical glands are infected this will do no good. An electric cautery, such as is used for nose and throat treatment is most effectual. This method was described by Dickenson in the *American Journal of Obstetrics and Gynecology* during the past year. The small point is carried into the crypt, actually destroying it. If the eroded surface is broad, the blade makes one or two cuts in each lip of the cervix. The cautery is not heated to a very high degree, and has somewhat the effect of the Percy cold iron treatment. The slough separates in one or two weeks, and the surface heals with considerable rapidity.

My experience with this has been largely with old cases. One cystic cervix, which had followed labor nine years before, healed satisfactorily with this treatment. Some of these cases will require surgical treatment later. Where there was a well established endocervicitis, the Sterndorf operation has been very satisfactory, although the Schroeder, or some modification of it, has been used in a number of cases with satisfaction.

Retrodisplacement of the uterus seems to be very frequent. Many observers agree that it exists in about 22% of all women examined. E. Schroeder, 1900, reported 28.7 retroversions in 411 gynecological cases. Only a few have investigated the frequency of uterine displacement after labor. Winter found that they occurred in 12% of 300 women from two to ten months after labor. Lynch, 1922, reports 41.1 in 505 clinic cases; and in 19.6 of 186 private

*Read before the Norfolk County Medical Society November 27th, 1922.

cases examined from six to eight months after labor.

My own records show 27 retrodisplacements in 200 private cases, or 13.5%. In my own cases I do not know how many were present before pregnancy but I think only about four were of the type which is usually congenital. It we were to double this to provide a margin, and say that 4% of all cases existed before labor, it would still leave 18% as due to labor. I hope that our hospital records may soon be available to give us additional information on these subjects.

If we admit the approximate accuracy of this, and also that the retrodisplacement is a considerable factor in pelvic diseases, we still have to agree that the discharge examination for the purpose of discovering these conditions, and applying suitable relief, is a necessity. Fortunately, the relief of retroversion after labor seems to be comparatively easy. With the exception of the cases which have had some inflammatory condition, simple office treatment will leave the percentage about the same as in the nulliparous, and some of these will be benefited by suitable operation.

Face position, knee chest position observation of patient as to progress of involution before allowing out of bed, have all been used to prevent retrodisplacement. The kangaroo walk as recommended by Polak has not yet been tried.

Pelvic inflammation of any kind favors retrodisplacement. Laceration of perineum does not appear to affect it. Stretching of the round ligaments during pregnancy, together with injury of the cardinal ligaments during delivery, promotes retrodisplacement. When the uterus is found to be retrodisplaced after labor, it is replaced manually by the aid of a tenaculum on the cervix. Gentle traction is made until the fundus is released, then the tenaculum is held by an assistant and, with two fingers in the vagina behind the cervix, the fundus is lifted forward. At this moment the assistant carries the cervix forward and downward, while the left hand on the abdomen catches the fundus and brings it forward. In some cases the uterus is left without any further treatment. If it remains in position, nothing further is needed, but if the retrodisplacement has recurred when the patient returns a week later, a pessary is used. This is changed once in thirty days. Usually

after about two months, in uncomplicated cases, the fundus remains in normal position. If adhesions are present the pessary will be of no use.

Twenty-two of my 27 cases of retrodisplacement after labor were in position when last examined. These patients can often tell when the uterus is out of position. The pessary gives information as to the relation of the symptoms which the woman may have due to retrodisplacement. If the symptoms are relieved, it is very good evidence that they are due to the displacement. If the retrodisplacement persists, and there is later evidence that it is interfering with health, some operation for retrodisplacement is done. I have used a considerable number, but have had most satisfactory results from a modification of the internal Alexander, which brings the round ligament to the under surface of the fascia near the internal ring.

The Johnston-Willis modification of the Coffey operation is extremely satisfactory, but the use of non-absorbable suture in the abdomen is not entirely satisfactory, and therefore we are not using that at present.

Does retrodisplacement of the uterus give symptoms? E. Schroeder in 1900, examined 411 women. Seventy-three per cent, or 303, had no pelvic symptoms, yet 26%, or 79, of these had retroversion. There were 108 women who complained of lower abdominal symptoms. Thirty-six per cent, or 39 cases, had retrodisplacement. He concludes that 25% of women who complain of no symptoms referable to the pelvic organs have retrodisplacement.

A recent study, 1922, by Lynch, showed that in a series of 505 cases of retrodisplacement, 32% complained of bearing down sensations, pressure in the pelvis, and backache; while only 10% of 725 normal cases complained of these symptoms. In other words, he found pelvic symptoms three times as frequent with retrodisplaced uteri as in normal cases. Apparently, the observations as to symptoms from retrodisplacement have been largely centered on local symptoms. Probably the effect on the patient's general condition is often as important. Although it is admitted that 22% is approximately a correct estimate for the incidence of retrodisplacement in cases examined, this does not mean that 22% of all women have retrodisplacement of the uterus.

When one considers that a woman is not likely to have a pelvic examination unless she has some pelvic symptoms, it seems reasonable to conclude that 22% who have symptoms referable to the pelvis have retroverted uterus. This would certainly seem to show that retrodisplacement was a factor of considerable importance in pelvic diseases.

Potential prolapse, cystocele, and rectocele cases are kept under observation until the nursing period has passed, when suitable treatment may be instituted. It seems particularly important that patients be told very plainly of the prospects if these conditions are not treated. The problem of the prolapsed uterus would be largely solved if this course could be always pursued.

512 *Taylor Building.*

THE DIAGNOSIS OF TUBERCULOSIS IN CHILDHOOD.*

By FRANK B. STAFFORD, M. D., Blue Ridge Sanatorium, Charlottesville, Va.

In recent years the diagnosis of pulmonary tuberculosis in adults has been placed on a fairly satisfactory basis. Dr. Lawrason Brown¹ has by formulating his five diagnostic postulates, given a valuable contribution to this work and placed it at the disposal of the entire profession. Briefly, they are as follows:

- (1). Definite physical findings above the second rib in front and the third vertebral spine behind.
- (2). Blood spitting.
- (3). Pleurisy with effusion.
- (4). Parenchymatous X-ray lesions in an apex.
- (5). And most important, the presence of tubercle bacilli in the sputum.

When we come to consider the diagnosis of tuberculosis in childhood there is quite a different situation confronting us. Little has been said or written that is really helpful. All have been satisfied to pass up the situation as most difficult without seeking to learn something of its various aspects. There is today a growing demand for a more thorough analysis and diagnosis of childhood cases, and any information or discussion of the problem must be helpful. It is quite obvious that the diagnosis must be made early and the proper treatment instituted at once if the prognosis is to be good. This has long since been proven true

in adult tuberculosis. Surely, it would apply more to the growing child that has the disease.

There is not a single diseased condition that requires more careful study of all the available data on the part of the clinician than childhood tuberculosis. Short cuts, clues, easy signs and clear markings of the disease are conspicuous by their absence. Time must be given; the case must be studied from every available angle; the data must be carefully correlated and digested before a final verdict can be rendered. Symptoms will invariably be more pronounced than physical signs. Other factors which will greatly aid in the diagnosis and must be considered are X-ray findings and the cutaneous tuberculin test.

Before taking up each of these separately it might be well to devote a little time to the discussion of what constitutes a normal chest in childhood. A committee² appointed by the National Tuberculosis Association to study the normal chests of five hundred children between the ages of 6 and 10 years reported their findings to the Association at the last meeting in Washington. The committee studied the chests from both, the standpoint of the physical signs and X-ray findings, and reported many variations in each that were still well within the limits of normal. They found the percussion note elicited over the normal chest to be fuller, more tympanitic and higher pitched; while the breath sounds varied from puerile, where the expiration was prolonged and higher pitched, to the normal type heard in adults. The X-ray findings were at such variance that it was decided to divide the chest into three zones from within outward, and deal with the shadows cast according to their location in the zones.

Tuberculous infection, considered now to be almost universal, is quite different from open, active, clinical disease. The infection may remain well under control and never give trouble if the child is kept strong and healthy, while on the other hand some exciting factor is apt to break down the resistance and sickness is the result with definite signs and symptoms. It is this form producing definite signs and symptoms and ranging from a tracheo-bronchial lymph adenitis to a localization in the hilar regions, occurring in children between the ages of six and twelve or fourteen years, in which we are most interested.

*Read at the meeting of the Piedmont Medical Society in Charlottesville, November 25, 1922.

HISTORY: The history is perhaps the most important piece of evidence at our command and is often the chief reliance in determining the real nature of the trouble. This, however, is not always easily obtainable; the child will have very little knowledge of past events and we must rely on the parents for this information. To consider the onset of the disease gradual and usually pursuing a chronic course in childhood, we can better understand why much time should be given to collecting all the positive facts connected with a complete history. Living conditions in the home should be investigated. A history of repeated contact, or prolonged exposure to the disease, whether in the home or outside of it, is of great importance. For one of the parents to be suffering from the disease, or a grandmother or aunt living in the home to have an old chronic fibroid lesion, it would make one search more carefully. It is also important to know that the milk supply in the home comes from a tuberculin tested herd. The child may get infected from this source. The German Commission³ appointed to investigate the danger to human health from drinking milk from infected cows reported one-fourth of the children examined to be tuberculous. The English Commission serving the same function reported one-half of the children having tuberculosis of the digestive tract to be due to bovine type. These reports seem to be rather high, probably due to the fact that the European cattle have a higher percentage of infection than the American. This is sufficient to say that bovine tuberculosis is now a reality and not a fancy. It should be remembered, however, that even though you are not able to get a history of exposure to tuberculosis, child is not tuberculous. On the other hand, either human or bovine, is no proof that the if such information can be obtained with definite clinical evidence, corroborated by X-ray findings, the diagnosis is well established.

SYMPTOMS: Certain local symptoms, such as cough, expectoration, hemoptysis and pleurisy, are important when they exist; but, where the lesion is well localized in the glands in the hila regions, all are apt to be absent unless it is a slight cough. Constitutional manifestations, such as afternoon rise in temperature, increased pulse rate, poor appetite, languor, loss of strength, fatigue, or lack of endurance, and failure to gain weight, should be carefully

noted. A stationary weight in a child is equivalent to the loss of weight in an adult. Any child who fails to gain weight over a period of from three to six months is suspicious and should make one think of pulmonary disease. Of all the symptoms that a tuberculous child may have, failure to gain weight, irregular and "finicky" appetite, and fatigue on exertion, are probably the most important. On returning from school in the afternoon the child prefers to lie around, has no energy, and is tired all the time. There is a distinct lack of "pep" which is so manifest in growing, healthy children. Susceptibility to colds is another important factor and when present should be carefully noted.

PHYSICAL SIGNS: The examination of the chest in this type of the disease is usually not worth much. The situation of the lesion makes it difficult to detect any abnormal condition. If the examiner has a full appreciation of the wide range the normal may present, less erring is apt to take place. Also, the younger the child, the more exaggerated are the normal findings. D'Espines's sign once thought to be indicative of enlarged glands in the hilum region is now known to be of little value. Dullness in the para-sternal and para-vertebral regions is to be relied on only when supported by the X-ray. A hilum dimple is of some diagnostic value when it exists. The breath sounds may be harsher, higher pitched, and have the expiration more prolonged than the normal puerile breathing heard in the hila regions. Palpable glands in the cervical and submaxillary regions are of no special significance unless superficially located, matted together, and they have a tendency to necrosis. Infected tonsils and carious teeth can cause enlarged glands in these regions. The chest should be examined for rales heard during inspiration following expiration and cough; but this, like hemoptysis and tubercle bacilli in the sputum, will not occur unless the disease has spread beyond the hilum into the parenchyma of the lung, or a caseous nodule has ruptured into a bronchus.

X-RAY: No examination of the child's chest is complete until stereoscopic X-ray plates have been taken and carefully interpreted by one experienced in this line of work. "Visionary interpretations"⁴ of the plates spoken of by Osler may occur if the internist attempts to read them. Especially is this true if on the

physical examination evidences of hilum involvement have been found and he is over-anxious to confirm it by the X-ray. Skill and good technique are necessary in making the picture, since it is hard to keep children quiet and have them hold their breath during the exposure. This adjunct like the physical has been found to show many variations from the normal. After-effects of certain diseases, such as deep colds, grippe, bronchitis, infected tonsils, measles and whooping cough, may cause increased hila shadows and thickening of the bronchial trunks not unlike a tracheo-bronchial tuberculosis. The expert in this particular field usually has certain differential points that guide him and prevent misinterpretations.

TUBERCULIN TEST: In regard to this point the same applies as to others entering into the diagnosis. There is a wide difference of opinion. Some have even gone so far as to say the diagnosis of tuberculosis in any form is incomplete unless supported by a positive tuberculin reaction. This is indeed, putting it too strong and we may expect much damage to the patient by its careless use. Especially is this true if administered subcutaneously. The cutaneous test of von Pirquet is the one most frequently used in children. This method is simple, harmless and easily applied. When positive, it only indicates the presence of a tuberculous infection and not necessarily a diseased condition. Too much importance must not be placed on a positive cutaneous test where there is no indication of sickness. On the other hand, if a child has a suggestive history with definite symptoms and signs, and the von Pirquet test is positive, the burden of proof is in favor of active, clinical disease. Certain conditions will alter this reaction. In advanced tuberculosis where the resistance is broken down and in some of the acute infectious diseases like measles the test may be negative. Of the 63 children admitted to Blue Ridge Sanatorium in the last few months, 55 have given a positive von Pirquet test. In most of these cases there was clinical evidence of disease and a positive diagnosis made. Of the eight that were negative, two were in the terminal stages of the disease with tubercle bacilli in the sputum, running temperature, and died soon after discharge. In the remaining six who were repeatedly negative there was no evidence of the disease and we were unable to make a diagnosis.

In the diagnosis of childhood tuberculosis, many other conditions not discussed here must be taken into consideration. Intestinal parasites, bad teeth, infected tonsils and adenoids, and the various physical defects may upset a bodily balance and be stepping stones to active disease. Again, these conditions may cause the disease to be masked in its incipency and the proper diagnosis postponed until it is too late to effect a *cure*. Many children are today dying of pneumonia and chronic dysenteries who have tuberculosis as their background.

SUMMARY.

1. To diagnose tuberculosis in childhood is to strike at the very root of the disease; to give the patient a chance to take the treatment early; and ultimately offer a better chance for recovery.

2. There is a much higher incidence of active tuberculosis in childhood than is generally thought.

3. In considering the normal chest of a child, many variations have been found from both the standpoint of physical signs and X-ray findings that are to be considered normal.

4. The diagnosis of hilus tuberculosis requires much time and a thorough analysis of four points:

- (a). Complete history, including symptoms.
- (b). Physical examination.
- (c). Stereoscopic X-ray plates.
- (d). Cutaneous tuberculin test.

All of these points are important but the outstanding factors are complete history with symptoms and X-ray.

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A REAL MAN

The test of a man is the fight he makes,
The grit that he daily shows;
The way he stands on his feet and takes
Fate's numerous bumps and blows.
A coward can smile when there's naught to fear,
When nothing his progress bars,
But it takes a man to stand up and cheer
While some other fellow stars.

—Selected.

NEWER METHODS OF DETERMINING CONDITION OF NUTRITION IN CHILDREN.

By SAMUEL NEWMAN, M. D., (Member Medical Commission, American Joint Distribution Committee).*

The problems of nutrition during the war and post war periods in Europe have been most vital to the very existence of the people and still are of great concern to those interested in the rearing of a young healthy generation in Europe. The question of practical and objective methods of determining the condition of nutrition among the millions of children became of paramount importance, since not all children in Europe could be considered in the scheme of supplementary feeding and other child welfare programs initiated by European and American relief agencies.

The question of malnutrition, and methods for its determination, have an entirely different aspect in private practice from that in social medicine. In private practice, or where the examination of only a small number of children is concerned, it is a mistake to consider malnutrition as a clinical entity and seek for a formula or mathematical index to express it. The physician must endeavor to go deeply into the history of the case and to bring into light the underlying cause of the poor state of nutrition of the individual which may be due to various causes, such as cardiac disease, metabolic disturbances, hyperthyroidism, faulty habits, etc. It is hardly probable that in America actual lack of food should be responsible for malnutrition.

However, the situation is entirely different when we are dealing with large groups of children, especially in Europe, which come under consideration from the nutritional viewpoint. Here malnutrition must be considered as a clinical condition *per se* and, when the necessity arises to select certain groups of children for certain feeding benefits, the need for objective methods whereby to determine the state of nutrition becomes evident—methods which will yield the same results in the hands of different examiners. The usual ratings, such as "good," "bad," "very bad," will suffer very much from the personal element of the examiners, and will not always admit those who, in the opinion of critical parents or com-

munities, are entitled to the feeding benefits, and will not be at all applicable to the examination of large groups of children.

Personally I was faced many a time with responsibility for selecting certain groups of children for various benefits, such as supplementary feeding, summer colonies, tuberculosis sanatoria, etc., from among war orphans, street and school children in Poland. The different standards of physical development used in the States as a measure of nutrition could not be applied in Poland for the reason that their use even in America is open to serious objections. All these standards state the degree of nutrition in terms of *weight* in relation to *height*. The fundamental objection to these standards are the following:

a. The height-weight index, or relation, varies with different races.

b. The relation of body weight—a quantity of three dimensions—to body length—a linear measure, is mathematically wrong and can by no means express a true inner relation between them, unless a formula is found whereby weight and length are reduced either to linear or cubic measures.

c. Anthropometric studies have shown that the body weight curve is a truer index to growth than body length. The standing height includes both trunk and lower extremities, but these do not grow as a functional unit. The trunk and the lower extremities both grow in accordance with an index of their own, therefore the comparison of standing heights is false for they represent merely the sum of different functional units—the trunk and the extremities—each growing in accordance with a law peculiar to itself.

In view of the above, a simple weight-and-length table could not be used in a country where the standing height of the children was subjected to even greater variations due to all sorts of disturbances of growth.

However, the war necessity proved also to be the mother of invention in the field of Nutrition Indexes. Space will not permit me to enumerate them all, neither is it necessary, as many have not yet stood the tests of time and critical application. I shall mention here two nutrition indexes and a brief clinical method to determine the state of nutrition in a child.

The Rohrer Index. The Child Welfare program of the Quaker Relief Mission to Germany depended upon the selection of children as its

*Dr. Newman is a member of the Medical Society of Virginia and was connected with the Health Department of Danville, Va., prior to becoming a member of the Commission. He is now attending the Children's Clinic, University of Vienna.

beneficiaries on the index devised by Rohrer, in Germany. This gives an expression of body volume, i. e. weight, thus: "Body weight X 100: length cubed." (Hundred times the weight of the body divided by the length of the body after it has been raised to the third power.)

This index, extensively used in Berlin in the examination of thousands of children, has been subjected to great criticism in Germany. In the examination of eighteen thousand children in Munich in accordance with the Rohrer Index it was noticed that many children looked far better than their grade obtained through the use of the index. Also the experience of school physicians in Germany spoke against the correctness of the values obtained for length in certain age groups, by means of the Rohrer Index. Personally I have had no experience with the Rohrer Index.

The Pelidisi Index. Professor Pirquet of Vienna made the observation that the sitting height of an individual, that is the distance from the top of skull to the sitting level, is equal to the cube root of ten times his body weight. This relationship is expressed by the following formula:

$$Si = \sqrt[3]{10 \text{ weight}} \quad \text{or, } Si^3 = 10 \text{ weight}$$

By dividing the cube root of ten times the body weight we get the figure *one*, or

$$\sqrt[3]{\frac{10 \text{ weight}}{\text{sitting height}}} \text{ Equals } 1.$$

For convenience, we make this one 100 in order not to have to deal with decimals.

Now this relationship of *sitting height* to body weight—not standing height—has proved to be applicable to examinations of hundreds of thousands of children in Austria. The feeding program of the American Relief Administration in Austria was based upon the selection of children by means of the Pelidisi Index. A normal individual should have a pelidisi of 100. Above 100 means overfeeding and below 94.5 means malnutrition. In the practical application of this Index of Nutrition all children with a pelidisi of 93 were at once admitted to the feeding stations.

This relationship of *sitting height* raised to the 3rd power being equal to 10 times the body weight, has been verified by Pirquet in the examination of fetuses, new-born, infants, chil-

dren and adults. This relation holds good for every period of life and only slight variations are to be taken cognizance of; namely, fat and well nourished infants reach an index of 100, while muscular adults show an index of 105. In school children a pelidisi from 95 to 100 is normal, below 95 is under nourished.

In selecting large groups of children and in classifying them in accordance with the varying degrees of undernourishment, the Pelidisi Index of Pirquet is the best and quickest method we have and can be carried out even by laymen. The determination is made very easily by means of the ordinary technical sliding rule or by means of the simple Pirquet Pelidisi table. I have had considerable experience with this method and it checks up fairly well with closer clinical examinations. The word "pelidisi" is not an accidentally coined word, but simply expresses the true relationship of the sitting height to body weight which Pirquet discovered. Thus—Pondus (weight), decies (ten times), linear (extracting root), diviso (divided through), sidentis (sitting height) expresses the relation.

A concise clinical method of determining the degree of undernourishment which can also be reduced to a schematic formula is the Sacratama method, also devised by Professor Pirquet. Pirquet states that in the picture of nutrition four (4) main components enter; namely, (*sanguis*) blood, (*crassitudo*) fat, (*turgor*) water content of subcutaneous tissue, and (*muscularis*) degree of muscular development. These four qualities are abbreviated thus.

S=blood

Cr=fat

T=turgor

M=muscle.

Any of these four components or qualities may be increased or decreased. The degree of increase or decrease is expressed by the vowels *i, e, a, o, u*, in the order of the lesser depth of the vowel sound. Thus—

i=very great; excessive; super-abundant.

e=increased; more; much; abundant.

a=normal.

o=decreased, less.

u=very little; almost absent.

The physician proceeds with the examination as follows: The child strips to his waist and the color of the skin is noticed as to its blood content. If normal the physician writes

Sa. Now a fold of flesh is raised below the clavicle and the fat content is noticed. If increased *Cre* is written down. Now a fold of skin is lifted up on the forearm. In case of the diminished turgor a fold is formed which stands up for a little while. In marasmic children we all noticed how the skin lies over the body in folds because of the lack of water in the subcutaneous tissues. If the skin fits well over the contour of the extremity the turgor is normal, hence *Ta* is written down. Lastly the degree of muscular development is noticed in the arms. The muscles may be weak and flabby, hence *Mo* is written down. We thus obtain the key word *Sacretamo*, which means a child with a normal blood content, very fat, normal turgor and weak muscular development. Similarly a child may obtain the formula *socratomo*, which means pale and lean, with flabby muscles and diminished turgor.

The classification of a group of children in accordance with varying degrees of undernourishment takes places after the sacratama method thus: A normal child has a rating of sacratama, that means he has not a single bad mark. Such a child belongs in the zero class. A child with one bad vowel, in the *one* class, etc.

No bad vowel.....	in 0 class
One bad vowel.....	in 1 class
Two bad vowels.....	in 2 class
Three bad vowels.....	in 3 class

After a little experience this method of examination gives the physician a great deal of clinical insight and teaches him that the various bad or good vowels he obtains in the examinations are not accidental but stand in definite relation to clinical conditions which the child has undergone. For instance, very diminished turgor will indicate an acute condition, for in chronic conditions, even though the blood content and the muscular development may be poor, yet the turgor accommodates itself to the underlying tissue and no fold of skin can be readily raised—that will mean that the turgor for this particular condition is normal whereas in relation to true health it is very much diminished.

In the Children's Clinic of the University of Vienna, pelidisi and sacratama determinations of all patients are a matter of routine and in a compact way give a real insight into the clinical history of the child.

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Reports of Cases

INSULIN IN DIABETES.

A Preliminary note on Personal Experience in the Use of Insulin

By ALEXANDER G. BROWN, Jr., M. D., Richmond, Va.

Insulin (Lilly) is an aqueous solution of the active principle obtained from the Islets of Langerhans in the pancreas. This extract has been used in the treatment of human diabetes during the past year in several clinics in this country and Canada. It has been made under license from the University of Toronto which controls the product. Those who were privileged to participate in the investigation during this early stage of its development were requested to refrain from publication until a considerable amount of clinical data had been accumulated and the Toronto group had gotten ready the publications of their observations. The preliminary papers of the Toronto group have been published for several months and their final conclusions are soon to appear in print. And so, now, others who have had opportunity to use and observe Insulin (Lilly) during this general experimental investigation have been notified of not only their release from further necessity for secrecy regarding results observed, but, on the contrary are urged to submit the results of their clinical and experimental observations to the profession.

The chapter of events and course of experimental development which entered into the evaluation of this product is a story of definite scientific interest and will have a place in the annals of medicine for all time. But we shall not tarry on this phase of its interest.

The unit is the standard of measurement of insulin. The unit of insulin originally adapted was the amount required to lower the normal blood sugar of a one kilogram rabbit to 0.45 per cent., at which convulsions generally occur. This was taken as the standard of dosage; but its standardization has been very difficult of uniformity. It is expected that in the near future considerable improvement may be expected in this. Of course, the effect on human diabetes must vary with individuals as there is variability in the power to burn carbohydrate. A unit of insulin, when injected into a human diabetic, enables the

patient, it is believed, to utilize or store from 1 to 4 grams more of carbohydrate than he could before administration. The number of units required to maintain a nearly normal blood-sugar, a sugar free urine, with a limited carbohydrate intake, is the amount needed for the patient under treatment.

Our experience with Insulin began on November 15, 1922. From that time up to the present time, April 28, 1923, we have been using it daily. We believe the claim made for it by its discoverers and the reactions it produces in the animal experimentation are justified by our observations.

In our clinical observations of it in the Stuart Circle Hospital, its effect upon the blood sugar of the patients was definite and uniform. Our first patient was brought in the Hospital in a semi-comatose condition, with a blood sugar of 426 milligrams per 100 cubic centimeters of blood; with a urine showing marked reactions of a diacetic acid, and a urine heavily loaded with sugar. The first day insulin was given in dosage of 8 units every hour for 12 hours. The second day the insulin was continued every hour for 12 hours. The urine was examined every hour without noting any change in the sugar reaction or in the diacetic acid.

On November the 17th, 10 units were given every hour for 12 hours. The patient's clinical appearance began to show marked improvement, but laboratory findings of urine showed no marked change. On November 18th, the fourth day of his treatment with insulin, 10 units were given the patient subcutaneously every hour until the fourth dose, when the urine reports from the laboratory began to show improvement. The sugar was disappearing; the diacetic acid reaction was becoming faint; and the blood-sugar had fallen to 168 milligrams per 100 c.c. of blood.

On November 28th, thirteen days after entering the hospital, this patient was being given subcutaneously only 10 units of insulin three times daily; he was receiving in his diet 30 grams of carbohydrate, 86 grams of protein, and 184 grams of fat; he was sugar-free in the urine; he was free of diacetic acid; and his blood sugar was 153 milligrams per 100 c.c. of blood. The patient had subsequent history of interest which will be reported in full later.

Another case was admitted to Stuart Circle Hospital January 4, 1923, in a state of pro-

found diabetic coma. The coma began about eleven hours before she was brought to the hospital. A catheterized specimen of urine showed an estimated 5 per cent. of sugar; the blood sugar was 580 milligrams per 100 c.c. of blood.

Insulin (10 units) was given subcutaneously at 7 A. M., 8:30 A. M., 9 A. M., 9:30 A. M. Twenty units were given at 10:30 A. M., 11:30 A. M., 12:30 P. M., 1:30 P. M., 2:30 P. M., 3:30 P. M., 4:30 P. M., 5:30 P. M.

January 5th, patient was unimproved; coma was deep; 10 units of insulin was given every hour for 12 hours. Blood-sugar examinations showed 320 milligrams per 100 c.c. of blood.

January 6th, patient was unimproved; coma was profound. Insulin, 10 units every hour, was continued. Blood-sugar was found to be 302 milligrams per 100 c.c. of blood. The patient was fed through a stomach tube liberal amounts of fruit juices and was given glucose intravenously. The patient died in coma. The marked drop of blood sugar from 580 to 302 milligrams of blood-sugar was significant.

The daily use of insulin in our hands has disclosed the following results:—

A. Favorable influence in diabetes in reducing hyperglycemia.

B. Favorable effect on ketonuria.

C. Favorable effect on urinary sugar.

D. Favorable influence on the increase of carbohydrate metabolism.

E. Favorable effect upon the mental symptoms of diabetes—giving a decided improvement in morale.

F. Favorable influence on the physical strength of diabetics.

G. Favorable effect on the distressing symptoms of diabetics, as thirst, inordinate appetite, polyuria, etc.

H. Favorable effect on all skin lesions, boils, scalp ulcers, hang-nails, cuts, hair, eruptions, accidental infections of diabetes.

Insulin does not supplant the diet-treatment of diabetes. While insulin does increase the power of the diabetic to burn carbohydrate, the dietary management of the patient is quite as necessary as heretofore. One of the problems before the internist in the use of insulin in diabetes is the adjustment of the dosage of insulin to diet; much the same method is followed in arranging the diet. The carbohydrate tolerance is determined, the ketogenic and anti-ketogenic balance is struck, the nitrogen balance is maintained. Insulin will make

each of the problems easier. Insulin is an agent that enables the crippled pancreas to receive help from the outside. There are untold possibilities in insulin for the control of hyperglycemia.

The treatment of coma is wonderfully advanced by the discovery of insulin. It undoubtedly is a direct and specific product which may be utilized with confidence in acidosis and coma. Not only is experimental proof given in the work of the Toronto group but, in the cases that have come under our immediate observation, insulin has shown undoubted favorable influence in acidosis and coma.

Precautionary measures in the use of insulin are necessary. It is undoubtedly a potent agent that is fraught with no inconsiderable risk. No one should attempt to use insulin unless the dosage and the effect is carefully checked by competent laboratory examinations of the urine and the blood chemistry. The too sudden lowering of blood sugar may make the diabetic the victim of convulsions and death may result. The medical profession and the public must be on their guard against such serious accidents as may result from the ill-advised and unskilful use of insulin. Already the wide publicity given this product in the lay press makes for serious dangers which must be averted by the careful and watchful use of the great discovery.

The Lilly Research Laboratories deserve our grateful appreciation for the large amount of insulin with which they supplied us free of charge in our clinical study of its use in diabetes.

Stuart Circle Hospital.

Analyses, Selections, Etc.

Graves' Syndrome and the Involuntary Nervous System.

Under the general caption, "Studies of Graves' Syndrome and the Involuntary Nervous System," Kessel, Lieb and Hyman¹ report in a series of nine articles a study designed "to promulgate a definite policy for the management of individuals suffering from Graves' Syndrome." Among the more striking conclusions reached by the authors are, that the complete picture of Graves' Syndrome may exist without elevation of basal metabolism, the normal metabolism establishing a differential

diagnosis from Graves' Syndrome; and that there is a marked tendency in patients with exophthalmic goiter to recover spontaneously.

Paper I¹ deals with thyroid enlargement in individuals without sympathomimetic manifestations. The authors have adopted the term of Barger and Dale, "Sympathomimetic," to denote manifestations that are tantamount to electrical stimulation of the thoracolumbar division of the involuntary nervous system, or to stimulation of the same system by adrenalin. In other words, *anatomically*, the term has reference to the same part of the nervous system as the "Sympathicotonia" of Eppinger and Hess.

Patients with "Graves' Syndrome," but with no significant elevation of basal metabolism, they regard as subjects of "autonomic imbalance," and the clinical study of these patients is presented in paper II².

The clinical study of 50 consecutive cases of exophthalmic goiter, (Graves' Syndrome with elevated basal metabolism) is reported in paper III³.

A study of the physiology and pharmacology of the involuntary nervous system, with an "attempt to find an index for the activity of the involuntary nervous system" is described in paper IV⁴.

Papers V, VI and VII⁴ deal with the application of this index to the role of alleged etiologic and therapeutic influences, as well as to factors which maintain the tonicity of the involuntary nervous system.

Paper VIII⁵ is a general summary of the clinical and laboratory work on the involuntary nervous system.

Paper IX⁶ is a discussion of pathogenesis and an evaluation of popular therapeutic procedures.

The general conclusions reached in the nine articles are as follows:³

1. Thyroid hyperplasia and thyroid adenoma may exist for years without at any time causing sympathomimetic symptoms or alteration in metabolism.
2. Disturbances of the involuntary nervous system clinically occur frequently (autonomic imbalance).
3. Such disturbances are usually not attended by metabolic elevation.
4. While these clinical manifestations of disturbances of the involuntary nervous system (autonomic imbalance) are often associ-

ated with thyroid hyperplasia, there is no reason to believe that the thyroid enlargement is causative and many reasons for thinking that it is secondary and symptomatic.

5. In exophthalmic goiter the dominant derangement is in the realm of the involuntary nervous system. This may not be primary, but the primary cause, whatever it be, must at least operate through the mediation of the involuntary nervous system.

6. The primary cause of exophthalmic goiter must be sympathomimetic.

7. There is a close relationship between exophthalmic goiter and autonomic imbalance. The latter usually presages the former, and is probably a stage in its development.

8. Evidence is presented to show that thyroxin is not sympathomimetic either directly or indirectly through synergism with epinephrin, even if it be granted that epinephrin controls the involuntary nervous system either in the tonic state or in emergency.

There is a marked tendency in patients with exophthalmic goiter to recover spontaneously. This factor must be carefully considered in evaluating "specific" therapeutic procedures.

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Spinal Drainage Following Intravenous Arsphenamine.

From the N. Y. Urological Institute. Author's conclusions relative to the treatment of syphilis of the nervous system are:

1. No single method of treatment is applicable to all cases.
2. The intravenous administration of arsphenamine is the method of choice.
3. Spinal drainage after intravenous administration of arsphenamine is not a hazardous procedure.
4. Drainage will benefit some cases which have arrived at a position of inertia under intravenous administration alone.
5. As satisfactory clinical and serological results may be obtained by intravenous arsphenamine and drainage as are produced by intraspinal method and without the severe root-

pains frequently set up by the latter method. (C. Burns Craig, Journal of Nervous and Mental Disease, August, 1922).

Sulpharsphenamine: Its Manufacture and its Chemical and Chemotherapeutic Properties.

The data presented show that sulpharsphenamine is an arsphenamine derivative very closely related in chemical structure to neoarsphenamine. This slight change in chemical constitution, however, imparts to the drug certain definite advantages over neoarsphenamine, as (1) ease of manufacture, (2) great stability of the drug in dry form and in watery solutions, (3) constancy of toxic and parasitocidal action of different lots, and (4) suitability for hypodermic administration. Every one of these advantages is of far-reaching importance, when consideration is given to the fact that enormous numbers of doses of arsphenamine are used in the control of syphilis.

As far as the experimental evidence is concerned the above mentioned advantages of sulpharsphenamine are firmly established. However, it is strongly emphasized that before this drug can be introduced for general use, it will be necessary to give it an exhaustive trial as to its curative power in human syphilis. (Carl Voegtlin, J. M. Johnson, Helen Dyer, *Public Health Reports*, November 10, 1922.)

Treatment of Neurosyphilis.

Every case of neurosyphilis, diagnostically established by combined clinical and serological tests, demands assiduous treatment of the general syphilitic infection by every means at our disposal. Antisyphilitic remedies, including mercury, iodides, arsenobenzol, etc., are to be administered by the most efficient route, whether by the mouth, by inunction or fumigation, by intramuscular injection, or by intravenous injection into the blood stream. In no case should our remedies be directed exclusively to the nervous system.

In gummatous and meningo-vascular neurosyphilis the foregoing anti-syphilitic treatment is usually all that is necessary.

Some cases of parenchymatous respond, but the majority are resistant to general antisyphilitic treatment, even when carefully and thoroughly carried out. Such cases are those which should be selected for supplementary

subarachnoid treatment, whether intrathecal or intracisternal.

Intraspinal treatment by salvarsanized serum prepared from the patient's own blood or by human or horse serum mercurialized in vitro, is specially suitable for cases of tabes and of cerebrospinal syphilis, provided cerebrospinal fluid shows evidence of active meningeal reaction. It is also suitable for meningo-vascular spinal syphilis when resistant to ordinary treatment.

The direct intraspinal administration of arsenobenzol into the cerebrospinal fluid is liable to produce acute softening of the spinal cord and should be discarded.

Cases of general paralysis of optic tabes, of tabo paralysis, and of tabes with negative reactions in the cerebrospinal fluid, are not likely to benefit by intraspinal treatment.

Cases of meningo-vascular cerebral syphilis benefit much by intracisternal administration of salvarsanized serum.

General paralysis, if recognized in the early stage, is definitely benefited by intracisternal treatment. This method is superior in efficacy to intraventricular operation and entails much less risk to the patient.

Pyrexial treatment of early general paralysis—for example by tuberculin, nuclein, etc., may induce temporary remissions in the disease. So also can simple drainage of the cerebrospinal fluid, combined with general antisyphilitic treatment.

Advanced cases of general paralysis, with extensive destruction of cortical nerve elements, are hopeless for curative treatment by any method whatever. (James Purves-Stewart, *British Medical Journal*, October 7, 1922.)

Treatment of Neurosyphilis with Spécial Reference to the Changes in the Cerebrospinal Fluid.

Two hundred cases were treated as regards the question of serological improvement; the results obtained in the treatment of fully established cases of neurosyphilis show a constant and progressive fall in the cell count until this reaches normal limits, almost constant modification of the colloidal gold reactions in the direction of a negative result, and in occasional cases, a change in the Wassermann reaction from positive to negative.

Improvement as regards gait, bladder control, lightning pains, and general health has

been repeatedly observed, though the lapse of time is not yet sufficient to warrant the conclusion that the disease has been arrested. The whole hope of the successful treatment of tabes and other forms of neurosyphilis lies in early diagnosis.

The routine treatment adopted has been a preliminary course of mercury and iodide for an average of two weeks, followed by a series of from 20 to 40 injections of 0.45 to 0.6 gram novarsenobenzol given at 7 day intervals. After every fourth injection two weeks rest was given. In addition mercurial inunction according to the Aachen methods was carried out and intramuscular injections of intramine in 5 c. cm. doses were given at monthly intervals. No intrathecal therapy has been attempted and silver salvarsan has not been employed. (Douglas K. Adams, *British Medical Journal*, October 7, 1922.)

The Truth About Medicine

During March, the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

Abbott Laboratories

Sulpharsphenamine-Abbott.

Borcherdt Malt Extract Co.

Borcherdt's Cod Liver Oil and Iron Iodide.

E. R. Squibb & Sons

Sulpharsphenamine-Squibb

Nonproprietary Article

Sulpharsphenamine.

NEW AND NON-OFFICIAL REMEDIES.

Mercurosal. — Disodiumhydroxymercurisalicicyloxyacetate. Mercurosal contains from 43.0 to 43.8 per cent. of mercury in organic combination. It is claimed that mercurosal is relatively free from irritant action, that it is eliminated without untoward effects on the kidney, and that the toxicity is relatively lower than mercuric chloride or mercuric salicylate. Mercurosal is intended for the mercurial treatment of syphilis. It is administered either intramuscularly or intravenously. Mercurosal is marketed in two forms: Mercurosal Intravenous, tubes containing mercurosal 0.1 Gm., and Mercurosal Intramuscular, tubes containing mercurosal 0.05 Gm. Parke, Davis and Co., Detroit, Mich. (Jour. A. M. A., March 24, 1923, page 844).

Pneumococcus Antibody Solution, Types I, II and III combined.—An aqueous solution of the specific pneumococcus anti-bodies, Types I, II and III in equal proportions, approximately free from the proteins of horse serum. There is some evidence that this antibody solution is of value in the treatment of lobar pneumonia.

Pneumococcus Antibody Solution, Types I, II and III Combined.—N. N. R., marketed in packages of one 50 Cc. double-ended vials with a complete intravenous outfit, and in packages of one 50 Cc. double-ended vials. H. K. Mulford Co., Philadelphia. (Jour. A. M. A., March 24, 1923, page 844).

Sulpharsphenamine.—The salt, disodiumdiomin-

odihydroxyarsenobenzenedimethylenesulphonate, adjusted by the addition of inorganic salt to an arsenic content of from 18 to 20 per cent. The arsenic content of 3 parts of sulpharsphenamine is approximately equal to two parts of arsphenamine. The actions and uses of sulpharsphenamine are the same as those of neoarsphenamine, over which it is claimed to have the advantage of greater stability of solution in the presence of air and of permitting subcutaneous injection. For subcutaneous or intramuscular use the drug is dissolved in sterile, freshly distilled water in the proportion of about 0.1 Gm. to 0.3 Gc.; for intravenous use a greater dilution is desirable. (Jour. A. M. A., March 31, 1923, page 919.)

Sulpharsphenamine-Abbott.—A brand of sulpharsphenamine—N. N. R. It is marketed in ampules containing respectively, 0.2 Gm., 0.3 Gm., 0.4 Gm., and 0.6 Gm. The Abbott Laboratories, Chicago. (Jour. A. M. A., March 31, 1923, page 919.)

PROPAGANDA FOR REFORM.

Peralga, a new German Synthetic.—For the past few years American Physicians have been relatively free from the propaganda of the foreign synthetic drugs—real or alleged. Recently, however, there have been signs of revival of this type of product. One of the products being endowed with the halo of creative chemistry is Peralga (Schering and Glatz), known in Europe as Veramon. The product is claimed to have been originated in the pharmacologic laboratory of Professor Starkenstein, University of Prague (who has lent his name to a number of statements valuable to the proprietary interests). Peralga is claimed to be a definite chemical compound, made by heating a mixture of barbital and amidopyrin, and it is claimed that this compound is absorbed without being split up into its component radicles. The A. M. A. Chemical Laboratory investigated Peralga. The examination developed that Peralga is not a definite chemical compound as claimed, but essentially a mixture of barbital and amidopyrin, containing an impurity produced in the fusion of the mixture. To determine if Peralga will produce any effects different from a mechanical mixture of barbital and amidopyrin in the same proportion, a specimen of Peralga and a mixture of barbital and amidopyrin in the same proportions as in Peralga were sent to the Pharmacologic Laboratory of Cornell University Medical College for comparative tests. The summary of the laboratory report was: "We can see no difference in the behaviour of cats towards similar doses of the two preparations; the mechanical mixture made in the A. M. A. Chemical Laboratory and the preparation of Schering and Glatz—and they show very little difference between similar doses of barbital and those contained in Peralga. * * *

"Of course there is no chance of making observations on cats that would show analgesic actions in headache. But since the observable effects on cats are so nearly identical, it is only fair to presume that the 'synthetic' and the mixture are practically alike in action." (Jour. A. M. A., March 31, 1923, page 942).

Prescribing Codein.—Codein is a derivative of opium and hence prescriptions for it come within the purview of the Harrison Narcotic Act, no matter what the individual physician may believe in respect to its habit forming properties. (Jour. A. M. A., March 31, 1923, page 945).

Biologic Reactions of Arsphenamin.—The complexity of the physical and chemical properties of arsphenamin probably accounts for the complexity of its biologic reactions resulting from the passage through the body. Among the most disturbing of these reactions are the nitritoid or anaphylactoid symptoms

occurring after intravenous injection. The earlier studies of the anaphylactoid reactions from arsphenamin cleared up certain features, but left the underlying causes untouched. The investigations of Jean Oliver and his collaborators lead to the conception that arsphenamine can exist in the colloidal state temporarily at least, and that the temporariness of this state is essential to anaphylactoid reactions. The investigators find that arsphenamin has a fairly constant agglutinating titer for blood corpuscles. The presence of electrolyte is essential for agglutination. The work suggests that agglutination by arsphenamin occurs during the transition stage from its colloidal into the crystalloidal state in the circulation, and that stabilization in the colloidal state prevents the agglutination. From their work they conclude that there are two phases to the reactions from arsphenamin: (1) the early or physical phase, which is concerned with the physical properties of the agent and results in the corpuscular agglutination with multiple embolism, the outcome being fatal sometimes, and (2) the later or chemical phase that results in parenchymatous degeneration of viscera (kidney and liver), this being due to the action of the arsenic ions in the usual way. (Jour. A. M. A., March 31, 1923, page 920).

Book Announcements

Essentials of Surgery. A Textbook of Surgery for Students and Graduate Nurses and for Those Interested in the Care of the Sick. By ARCHIBALD LEETE McDONALD, M. D., of Johns Hopkins University; formerly in charge of Department of Anatomy, University of North Dakota, etc. Second Edition Revised. Philadelphia and London. J. B. Lippincott Company. One of series of Lippincott's Nursing Manuals. Cloth. 1923. 8vo. 293 pages including a Glossary and 49 illustrations. Price, \$2.50.

Physics and Chemistry for Nurses. By A. R. BLISS, JR., A. M. Phm. D., M. D. Lecturer on Chemistry and Materia Medica, Grady Hospital Training School for Nurses, Atlanta; etc., and A. H. OLIVE, A. M., Ph. Ch., Phm. D., Lecturer on Chemistry, Hillman Hospital Training School for Nurses, Birmingham, etc., with collaborators. Third Edition Thoroughly Revised and Rewritten and conforming to requirements of the standard curriculum (1922) of the National League of Nursing Education. Philadelphia and London. J. B. Lippincott Company. One of series of Lippincott's Nursing Manuals. Cloth. 1923. 8vo. 190 pages including a Glossary and 70 illustrations. Price, \$2.50.

The Form and Functions of the Central Nervous System. An introduction to the Study of Nervous Diseases. By FREDERICK TILNEY, M. D., Ph. D., Professor of Neurology, Columbia University; Attending Neurologist, Presbyterian Hospital, and New York Neurological Institute, etc., and HENRY ALSOP RILEY, A. M., M. D., Associate in Neurology, Columbia University, etc. Foreword by GEORGE S. HUNTINGTON, Sc.D., M. D., Professor of Anatomy, Columbia University. Second Edition. 591 figures containing 763 illustrations of which 56 are colored. New York. Paul B. Hoeber. 1923. 8vo. 1019 pages. Cloth. Price \$12.00.

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Editorial

The Heart In Old Age.

He was seventy-three. He never had had an acute sickness. He was Cornish. He had worked in youth for years as a miner. For the last ten years he has been retired from active business and has lived with his son on a farm. He has taken care of fifty hens, one cow, a small garden, and in winter cut fire wood and performed a few duties about the place. He has had a good appetite; he has grown stout.

Within the past three months his breathing has become more frequent on exertion; within the last three weeks he has had shortness of breath; his legs have swelled; his heart now beats fast; his pulse has become rapid and irregular.

The heart of old age is grossly neglected. For seventy-three years, in this case, it has been beating one hundred and fifty thousand times daily; or, for seventy years, this man's heart has made three billion, eight hundred and thirty-two million and five hundred thousand contractions, without showing to him, at least, any signs of failure in compensation, or failure to do its work. And here within the last few months, after contracting and maintaining a balanced circulation through the elaborate vascular channels of the body, it has begun to show gross and serious evidence that it will no longer, for any considerable period of time, continue to perform its ceaseless task.

This old man's heart is going on a strike.

This old man's heart is losing its conductivity, rhythmicity, contractility and irritability. After three billion odd beats, it is beginning to fail.

As age advances, there is a right side hypertrophy in the heart and the distribution of the blood supply undergoes considerable alteration with the evidence of increase in tortuosity. The blood supply of the average heart of the first decade, in its main branches, pursues a straight and even course.



*Roentgenogram of the blood supply in the average heart of the first decade.

In the seventh decade you observe the increased relative anemia of the right side, the marked tortuosity of the vessels, the rich and abundant septal anastomoses, and the well-developed fat-vessel network.

One of the most common causes of heart failure in the old is disturbance in the coronary circulation that brings about poor heart nutrition. Of course, this may occur in a sudden manner by an embolus or thrombus. But the most common way in which this occurs is sclerosis in the coronary vessels or in the aorta. The nutritional changes in the heart muscle will follow upon circulatory sclerosis. Likewise, it will be found that myocardial degeneration will occur in the muscular deficiency due to muscular fatigue or from general constitutional diseases where there has been over years a retention of body poisons.

Myocardial weakness of old age may show

itself as a result of high blood pressure resistance or from over-work or severe physical labor. The outstanding symptom in these cases is the evidence of cardiac deficiency. The deficiency may be ushered in by some symptom-complex like an attack of angina pectoris, an Adams-Stokes' syndrome, and an arrhythmia, or a pulmonary edema. The symptom may be mere faintness or dizziness. Or there may be the serious sign of breathlessness or a sense of oppression. Pain may be the dominant symptom, sometimes associated with work af-

be intermitting. But irregularity in systolic contraction is the most common manifestation of its impending failure. The arrhythmia may be extrasystoles or auricular fibrillation. The heart is enlarged and cardiac dullness is increased. As you place your stethoscope over the heart, you note the distant feeble heart sounds; the first sound may be sharp and short and the second pulmonic or aortic may be accentuated, but repeated examination may disclose the gradual loss of this accentuation. A systolic murmur along the base is usually heard. The murmur may be soft or blowing or may be harsh and have musical quality, depending upon the vegetative growth about the endocardiac openings. Murmur may be increased by exercise, or discovered at one time and not heard at another. Venous pulse and tricuspid regurgitation and pulmonary edema may be added signs of impending heart failure.

What can be done for these old hearts?

- I. Carefully study the whole body.
- II. Carefully study the habits.
- III. Put the patient to bed.
- IV. Make a blood chemistry examination, blood sugar, blood urea, non-protein, nitrogen.
- V. Look for focal infections and eliminate them.
- VI. Regulate the diet and reduce the intake of food at night.
- VII. Consider digitalis, caffein, strychnine.
- VIII. Cut out salt and meat.
- IX. Admonish against over-exertion.

Angina Pectoris.

The question of anastomosis of the coronary arteries seems to have been very much interlinked with the question of the production of angina pectoris. But now, it is generally conceded that anastomosis* exists between the right and left coronary arteries, in their capillary as well as their precapillary distribution; that anastomosis exists between the branches of each coronary artery; that anastomosis exists between coronary arteries and vessels from adjacent and attached organs; that anastomosis in the heart is universal and abundant. The coronaries do anastomose and angina pectoris is not due to the closure of one artery and failure of collateral circulation to be established. It is rather due to combined



*Roentgenogram of the blood supply in the average heart of the seventh decade.

ter meals. Eructation may relieve the pain. Erroneously, this important cardiac symptom is overlooked by both the doctor and the patient. Precordial fullness, a lump in the chest, difficulty of breathing in a man in the sixth or seventh decade, are serious signs. Dyspnea or anginal pain in the sixth or seventh decade means that the myocardial structure of the body is becoming ominously defective. Observation of the apex beat shows it is displaced, may be beyond the nipple line, and the impact and impulse are diffuse and feeble. There is also pulsation in the vessels of the neck to a marked degree. The heart may be beating regularly but too slowly; it may be beating rapidly and regularly or irregularly; it may

*Roentgenograms taken from "The Blood Supply to the Heart," by Louis Gross, M. D., C. M., Paul B. Hoeber, New York, publisher.

**"The Blood Supply to the Heart," by Louis Gross, M. D., C. M., Paul B. Hoeber, New York, publisher.

disease of the coronary arteries in which inadequate cardiac circulation may be maintained. It may be due, however, to diseases not in the coronary, but in the aorta, by partial or complete occlusion, of the lumen of the coronaries at the origin; such as, aortitis or valvulitis of the aortic valve.

Of course, the coronaries may participate in a general arteriosclerosis of the systemic vessels and the same ischemia of the myocardium may be produced, resulting in the anginal syndrome.

An embolus or thrombus also may block one coronary and the age of the patient may be such that the anastomoses are incapable of affording an adequate arterial inflow of blood and thus may ensue the same clinical picture.

Again, on the principle of the intermittent claudication which occurs in the abdominal arteries, the coronaries may become, from some cause, suddenly in arterial spasm and the blood supply of the contracting myocardium may become consequently restricted to the point of producing muscle pain or angina.

Anginal attacks come in the fifth or six decade from fast walking, walking against the wind, some form of over-exertion, from sudden emotion, as fear or anger, from over-eating, a distended stomach. The condition is characterized by an intense pressure in the upper chest; the vise-like pain is sometimes agonizing, possibly only a substernal ache or radiation of pain down the left arm is felt, mental distress and sense of impending death. The attack may terminate by sudden death, by an attack of syncope, by feeling of exhaustion and evidence of heart dilatation. The patient may, however, recover in a short time.

The patient who once has an attack of true angina pectoris should receive a painstaking examination of the entire body and the problem of prolonging the life by preventing return attacks should be fairly faced.

The Heart in Thyroid Disease.

The hyperfunctioning thyroid adenoma and exophthalmic goiter produces and discharges into the systemic circulation an excessive amount of thyroxin, the physiologic and normal active principle of the thyroid gland, and, after an indefinite period of time, this product, probably perverted somewhat, in the case of exophthalmic goiter, produces two fundamental reactions on the heart. This effect upon the heart should be clearly appre-

ciated because cardiac activity and function may play an important part in the clinical cause of hyperthyroidism.

The first effect is brought about by the excess of thyroxin in the tissues of the body. This makes for an elevation of the basal metabolic rate. This produces increased cardiac work, increased cardiac rate, increased contraction amplitude. The greater volume outflow of blood for each beat, which results, leads to hypertrophic changes in the heart muscle and eventually dilatation of the organ.

The second effect of thyroxin is on the heart muscle cells. The muscle structure, under the influence of excessive thyroxin, undergoes a degenerative myocarditis. Muscle fatigue results. Heart contractions may become irregular, following increased rate. The hypertrophy and dilatation of the heart may lead to its failure. The irregularities of the heart culminate in auricular fibrillation often times. In the Mayo Clinic,* auricular fibrillation was found in seven per cent of patients suffering with exophthalmic goiter and in nine per cent of cases of hyperthyroidism.

Auricular fibrillation may be present at times only, or it may be persistently present in these cases. Of course, its presence considerably accentuates the gravity of the prognosis; approximately, it is estimated, doubling cardiac mortality. Auricular fibrillation in the goiter heart may be taken to mean definite myocardial degeneration from overdoses and over time saturation of thyroxin. Of course, its persistence is a strong contraindication to operative procedure for the relief of goiter. Likewise, auricular flutter, with or without partial heart block, is a graver indication of muscular degeneration from thyroxin of hyperthyroidism and perversion of the secretion of exophthalmic goiter. Such cases are, strictly speaking, medical cases; while operation is indicated, no doubt, to curtail the hyperactivity of the diseased thyroid, the stage of the clinical evaluation that is characterized by auricular fibrillation (persistent) and auricular flutter is one to be managed by the internists, so far as cardiac irregularities go. It is in this goiter heart activity that massive digitalis administration is indicated by the internist. Digitalis saturation is needed. Digitalis to the point of vomiting and even to partial heart block may enable the internist to establish in the thyroxin poisoned myocardium

*"The Heart in Thyroid Disease," by Fred A. Willinus, Mayo Clinic, Rochester. *Annals of Clinical Medicine*, Jan., 1923.

some form of normal conduction, contractility, irritability and rhythmicity.

In our experience with digitalis in thyroxin cases, no one plan for its administration can be at once laid down. With the idea of bringing the myocardium under the effect of digitalis by mass attack, the administration for a period of seventy-two hours may be made by giving 2 c.c. (30 minims) every eight hours. Even larger doses may be required. Care should be exercised, however, remembering that the "couple beats," "nausea," "slowing pulse," or "heart block" are all signs of digitalization. The radial pulse must not be trusted. The stethoscope over the apex, the finger on the radial pulse, and the eye on the right supraclavicular space may give you the evidence of digitalis-control with fair accuracy.

News Notes

Dates Selected for State Meeting.

The Executive Council of the Medical Society of Virginia, at a session held April 27, selected October 16, 17, 18 and 19 as the dates for the Roanoke meeting of the State Society. It is hoped that all members of the Society will work for the success of this meeting and that as many as possible will attend. Roanoke doctors have been actively at work on their plans for sometime.

Nutrition Institute.

During the two weeks beginning April 9th, Dr. William R. P. Emerson, pediatricist, Boston, Mass., and his assistant, Miss Mabel Skilton, conducted an institute in Richmond on the nutritional problems of childhood. The institute, which was a decided success, was conducted under the auspices of the Virginia Co-Operative Child Welfare Committee, an organization composed of representatives from forty-six State and City organizations. Dr. C. C. Hudson, health officer of Richmond, served as chairman of this committee. Approximately one hundred and twenty public health workers from various parts of the State took advantage of this opportunity to learn more about this very important phase of public health work, and took the full two week's course. In addition to those taking the full course of instruction, some sixty others took most of the course during the second week.

The nutrition class was addressed by Prof. Harris Hart, State Superintendent of Public Instruction, Dr. Roy K. Flannagan, Assistant State Health Commissioner, Dr. L. T. Royster, of Norfolk, Dr. Beverley R. Tucker, of Richmond, Miss Agnes D. Randolph, Director of the Bureau of Tuberculosis Education of the State Health Department, and Mr. Irving R. Spear, of the Virginia Tuberculosis Association.

This was the thirtieth institute conducted by Dr. Emerson during the past three years, and his course of instruction here, as elsewhere, was exceedingly valuable to public health workers, especially those interested in school inspection. From investigations, Dr. Emerson's belief is that the problem of malnutrition of children is one with which the poor are not so much concerned as the rich, some of the prime causes of malnutrition being irregular habits of sleep, food, exercise and rest.

During Dr. Emerson's stay in Richmond five nutrition classes were organized in the Richmond public schools, and one class among the children of the Methodist Orphanage. The five classes organized in the public schools are being continued under the supervision of Dr. N. Thos. Ennett, Director of Medical Inspection of Schools. The class organized at the Methodist Orphanage is under the supervision of Dr. M. E. Nuckols, who has charge of the Orphanage medical work. Dr. James B. Stone, of Richmond, will be in charge of two classes which are being organized for mothers. It is expected that additional nutrition classes will be organized in the near future.

The Virginia-West Virginia Section, American College of Surgeons

Held a two day's session in Norfolk, Va., April 23 and 24, Dr. Lomax Gwathmey, Norfolk, presiding over the Virginia division, and Dr. J. Ross Hunter, Huntington, over the West Virginia Section. Dr. Julian L. Rawls, Norfolk, was secretary for the Virginia section, and Dr. Thos. W. Moore, Huntington, of the West Virginia section. Between thirty and forty physicians outside of Norfolk County registered attendance. Excellent clinics were held at the various hospitals during the morning hours of both days. As the American College of Surgeons has made hospital standardization one of its principal works, much time was given to the discussion of this sub-

ject and much valuable information was elicited.

The new officers elected for the Virginia Section are: Dr. J. Shelton Horseley, Richmond, chairman; Dr. A. Murat Willis, Richmond, secretary; Dr. Stephen H. Watts, University, counselor. The place of the next meeting is to be decided later.

The Virginia Society of Oto-Laryngology and Ophthalmology

Held its annual meeting in Richmond, April 18, with an attendance of about seventy-five specialists. Eight new members were received at this meeting. Dr. Elbyrne G. Gill, of Roanoke, presided and delivered his address as president. A symposium on "Refraction" was handled by Drs. Emory Hill, Richmond, H. S. Hedges, Charlottesville, and Hunter McGuire, Winchester. Several other members also presented papers and Drs. Walter Lambert, New York, Lewis Fisher and H. M. Langdon, both of the latter of Philadelphia, read papers by invitation. Dr. Wells Eagleton, Newark, N. J., was prevented by illness from taking part in the program. Luncheon was tendered the visitors and out-of-town members at Commonwealth Club, by the Richmond Society of Oto-Laryngology and Ophthalmology.

It was decided to hold the next meeting in Lynchburg in the Spring of 1924. Dr. Joseph A. White, Richmond, was elected president; Dr. James Morrison, Lynchburg, vice-president, and Dr. E. U. Wallerstein, Richmond, was re-elected secretary-treasurer.

The South Piedmont Medical Society

Met in Danville, Va., April 17, and had an excellent meeting. A number of interesting papers were read, including a symposium on Pneumonia. South Boston was selected as the next place of meeting and the following officers elected: President, Dr. P. W. Miles, Danville; vice-presidents, Drs. James Morrison, Lynchburg, S. T. A. Kent, Ingram, W. E. Jennings, Danville, and C. W. Tucker, Drakes Branch. Dr. George A. Stover, South Boston, was re-elected secretary-treasurer.

The San Francisco Meeting.

Official call has been issued for the seventy-fourth annual session of the American Medical Association in San Francisco, Cal., June 25-29, inclusive. The House of Delegates will

convene on Monday, June 25th; the Scientific Assembly will open with the general meeting on the 26th, at 8 P. M.; the various sections of the scientific meeting will meet Wednesday, the 27th, at 9 A. M. and 2 P. M., and subsequently according to their respective programs.

Many attractive side trips have been arranged. Those who wish to enjoy a short water trip may have an 18 hour ocean trip between Los Angeles and San Francisco, either going or returning.

The Salt Lake (Utah) County Medical Society has issued invitation for members to stop over in Salt Lake City, before or after the meeting, and, if you communicate with Dr. Floyd F. Hatch, secretary, Deseret Bank Building, Salt Lake City, Utah, as far in advance as possible, giving number in party and length of stopover, arrangements will be made to show visitors something of the beauties of that section. Other local medical organizations will also entertain visitors, especially those who are on special trains.

A special train will leave Chicago, over the Burlington Railroad at 11 p. m., June 20. This will make stops at a number of places and reach San Francisco at 5:30 p. m., June 25. Particulars as to this train and any other information may be obtained from Dr. W. E. Musgrave, chairman, Local Committee of Arrangements, 808 Balboa Bldg., San Francisco, Cal.

Another special to this meeting will be that known as the "Southern Medical Association's Special Train," which will leave St. Louis, at 9 a. m., Tuesday, June 19th, and, after stopping at several places, will reach San Francisco at 5:45, June 24th. For fares, Pullman rates, schedule or other information, write "Southern Medical Association, Empire Building, Birmingham, Ala."

The Southampton County (Va.) Medical Society

Met at the home of Dr. R. L. Raiford, in Sedley, May 3. This meeting was largely attended and was most successful from a scientific point of view. At 2 p. m., there was a clinic at which time normal and subnormal children were examined. This was followed by a paper on "Nutritional Disorders of Childhood," by Dr. Franklin D. Wilson, of Norfolk. Later there was a reception at which there were five minute talks on "The Aims of

our County Society," by the president, Dr. E. F. Reese, Courtland; on "The Co-operation of the Medical Profession: With the Church," by Rev. Nathan Pickett, Sedley; "With the Public School System," by R. M. Newton, Superintendent of Public Schools of the County; "With the Board of Public Welfare," by Miss Mary Babb, Superintendent of the Board of Public Welfare; and "With the General Public," by Paul Scarborough, Editor of the *Tidewater News*. It is thought that much good will result from this meeting.

Dr. Dunn Resigns Professorship.

Dr. John Dunn, Richmond, has tendered his resignation as professor of otology, rhinology and laryngology at the Medical College of Virginia, effective at the end of this session, and was by unanimous vote chosen professor emeritus of this branch. Dr. Dunn was connected with the faculty of the former University College of Medicine from its organization in 1893 and has been a member of the faculty of the Medical College of Virginia since the consolidation of these two medical schools in 1913.

It is announced that Dr. Joseph A. White, now professor of ophthalmology, will have charge of the combined chairs of ophthalmology, otology, rhinology and laryngology, next session.

Dr. Dean B. Cole,

Richmond, has been called to Chilhowie, Va., on account of the illness of his father.

Celebration of Pasteur's Centenary.

A number of physicians from the United States are planning a tour of France between July 11 and August 18. Because this is the time of the celebration of Louis Pasteur's centenary, this visit is being sponsored by the French government and participants will have free access to many highly interesting social functions not ordinarily open to visitors. It is possible to leave New York as late as July 4 to join this party. The trip is to include visits to many places of unusual interest.

If interested, write for full details, addressing L. J. Garcey, General Agent, Railways of France, 281 Fifth Avenue, New York City.

West Virginia Medical Association.

Don't forget the dates of the West Virginia Medical Association are June 12, 13 and 14,

and the place Beckley. A most cordial invitation has been extended all members of the Medical Society of Virginia as well as other medical associations to attend. It is likely that several pullman parties may be made up from Virginia. If you expect to attend, communicate with Dr. Charles S. Smith, Beckley, W. Va., secretary of the Raleigh County Medical Society for details as to the meeting.

Box for State Health Department Supplies Furnished Physicians.

In order to facilitate the collection of reports of contagious diseases and other vital statistics by county health officers so that they may more quickly apply preventive measures, the State Health Department has sent to each physician, in counties having organized health departments, attractive boxes containing report cards and forms, mailing cases for collecting and sending specimens to the State Laboratory, and a copy of the revised rules and regulations. Inside the lid of each of these boxes is a synopsis of public health laws and a list of supplies furnished by the State Board of Health. Having these health department supplies all in one place should prove a convenience to the doctors and a great aid in promoting prompt reports. These boxes, while prepared primarily for physicians in counties where there are whole time health officers, are available, on request, to other physicians, as long as the present limited supply lasts.

Malaria Control.

Pursuant to a change of plan in malaria control work, the counties of Accomac, James City, Princess Anne and Henrico have accepted the financial aid of the State Board of Health in co-operation with the International Health Board in establishing whole time county health units. These units began operation on May 1, each with a personnel consisting of a medical health officer and public health nurse. Two of these counties have a sanitary officer. These units will feature malaria control.

Dr. B. B. Bagby, recently of West Point, Va., will have charge of the work in Henrico County, with headquarters in Richmond; Dr. John O. Gaston, of Rochester, Mich., will be in charge of work in Accomac County, with headquarters at Accomac; Dr. J. L. Sanford, of Clifton Forge, will look after the work in Princess Anne County, with headquarters at

Oceana; and Dr. J. H. Crouch, of Smithfield, Va., will look after the work in James City County, with headquarters at Williamsburg. All entered upon their duties May 1.

Dr. Malcolm Hart Harris,

Of Pendletons, Va., located in West Point, Va., the first of May, and will take up the practice of Dr. B. B. Bagby, who has entered the malaria control work in Virginia. Dr. Harris is a graduate of the class of '22, Medical College of Virginia, and has for the past ten months been an assistant physician at Southwestern State Hospital, at Marion, Va.

Dr. Hunter McGuire

Returned to his home in Richmond, the latter part of April, after a pleasure visit to Philadelphia.

Dr. and Mrs. J. J. Kindred,

Of New York, recently visited their son, who is a student at Randolph Macon College, Ashland, Va. Dr. Kindred is a native of Southampton County, this State, and has many friends in Virginia.

Dr. M. L. Dalton,

Recently of Floyd, Va., has located at Hinton, W. Va., where he will continue the practice of his profession.

Dr. William M. Sheppe,

Who has been instructor in pathology and bacteriology at the University of Virginia, is now at Ohio Valley Hospital, Wheeling, W. Va.

Doctors With Richmond Rotarians.

Dr. Charles R. Robins has been elected a member of the board of directors and Dr. Greer Baughman has been appointed a member of the Program and Entertainment Committee of the Richmond Rotary Club.

The Woman's Auxiliary to the Richmond Academy of Medicine and Surgery

Was organized at a meeting held at the home of Mrs. J. Allison Hodges, in this city, on May 2nd. Sixteen ladies were present and they were enthusiastic in their endorsement of the Auxiliary. Officers elected are: County chairman, Mrs. Ramon Garcin; City chairman, Mrs. Francis W. Upshur; vice-presidents, Mrs. C. E. Llewellyn, Mrs. J. Blair Fitts and Mrs. Thos. Wheeldon; secretary-treasurer, Mrs.

Arthur S. Brinkley. Committees were appointed to assist in the various phases of work to be undertaken by the Auxiliary.

The American Association of Pathologists and Bacteriologists,

At its annual meeting held recently in Boston, elected Dr. Theobald Smith, Princeton, N. J., president, and Dr. Howard T. Karsner, Cleveland, secretary. At this meeting the custody of the cane was conferred upon Dr. William H. Welch, of Baltimore. Dr. Harold C. Ernst, of Boston, the first recipient of the cane, before his death in 1922, conceived the idea of conferring the custody of the cane for lifetime in recognition of the services of those who represent the best in the traditions of medicine. Dr. Welch is the second recipient of this honor.

D. Charles E. Conrad

Has returned to his home in Harrisonburg, after a visit to Atlantic City, where he spent some time recuperating from a recent illness.

Dr. B. P. Seward,

Of the class of '22, Medical College of Virginia, who has been an interne in Stuart Circle Hospital, Richmond, since July 1, 1922, will be associated in practice with Dr. W. W. Seward, at Surry, Va., beginning next July.

Dr. R. W. Garnett

Has been re-elected city health officer of Danville, Va., for a period of two years.

Miss Rose Z. Van Vort,

Superintendent of Stuart Circle Hospital, was recently elected president of the Richmond Nurses' Clubs.

Dr. W. Harman Evans,

Lynchburg, Va., was badly bitten by a German police dog, last month, when he went to make a professional call several miles out of the city. The dog attacked Dr. Evans, knocked him down three times and severely hurt his left arm and right leg, before Dr. Evans was able to catch and hold him until he could get help.

Dr. W. P. Hoy,

A member of the board of directors of the Rotary Club of Petersburg, Va., has been elected manager of the Rotary baseball club of that city.

Dr. E. C. Harper,

Who has been connected with the medical staff at Catawba Sanatorium, Va., is now located at Fries, Va.

Dr. H. D. Ribble

Has returned to his home, Sandy Mound Farm, just outside of Blacksburg, Va., after being out of the State since last November.

Dr. Willim H. Higgins

Became head of the Medical Department of St. Elizabeth's Hospital, Richmond, April 1, 1923. He gives a few hours in the afternoon to this work. While Dr. Higgins is attending physician to St. Elizabeth's Hospital, he will, of course, continue his private practice as heretofore, with offices in the Professional Building.

New Hospital Wing at University.

Contract has been let for the immediate erection of the \$115,000 wing at the University of Virginia Hospital and it is planned to have it ready when the University opens in September. This wing will be immediately south of the present hospital buildings and will conform to the Steele wing on the north. This new building is made possible at this time by a gift from Paul Goodloe McIntire. This new wing is to house the obstetrical and orthopedic departments of the hospital and will provide sixty-three beds in addition to two nurseries, one for white and one for colored children. The moving of these departments from the main hospital building will give more room there for general cases.

Dr. R. E. Booker

Has returned to his home at Lottsburg, Va., after a vacation of several weeks spent in Florida.

Dr. A. I. Dodson

Has opened offices in Professional Building, this city, for the practice of urology, and will have office hours from 5 to 7 P. M. and by appointment. He will, however, continue his association, as before, with St. Elizabeth's Hospital and Dr. J. Shelton Horsey.

Public Health Institutes.

Such general interest was manifested in the venereal disease institutes conducted by the U. S. Public Health Service, that the Service now contemplates the establishment of in-

stitutes for supplementary training in the field of preventive medicine. It is proposed to establish one or more such institutes, of six to eight weeks' duration, at important medical centers or at Washington, the subjects to be decided upon later. An institute of the character proposed would aim to stimulate up-to-date intensive training for all persons engaged in various kinds of public health work; it would provide up-to-date instruction which would enable practicing physicians to deal effectively with the more important causes of mortality and disability; and it would bring together practicing physicians and health officers and so establish a more co-operative relationship in the work of disease prevention.

Married.

Dr. Charles Young Bidgood, Baltimore, Md., and Miss Mary Taylor Carrington, Danville, Va., April 21. Dr. Bidgood is an alumnus of the University of Virginia, being a member of the class of '20.

Lt. William Harvey Whitmore, M. C., U. S. N., and Miss Harriet Weiss Angeny, Philadelphia, April 5. Dr. Whitmore was formerly of Lynchburg, Va., and a member of the class of '16, University of Virginia, Medical School.

The American College of Physicians,

Meeting in Philadelphia, April 6 and 7, elected Dr. Harlow Brooks, New York, president, and Dr. Frank Smithies, Chicago, secretary.

The Tennessee State Medical Association,

In annual session in Nashville, in April, elected Dr. Hampton L. Fancher, Chattanooga, president, and Dr. Jos. F. H. Gallagher, Nashville, secretary. The next meeting is to be held in Knoxville.

New Professor at Jefferson Medical College.

Announcement is made of the election of Dr. Withrow Morse, professor of physiological chemistry in the West Virginia University School of Medicine to the position of professor of physiological chemistry and toxicology in Jefferson Medical College. Dr. Morse is recognized as a man of ability and Jefferson College is fortunate to have secured his services.

American Society for the Scientific Study of the Medical Aspects and Treatment of Cancer.

It has been proposed by a number of phy-

sicians to form an association for the above purpose and Dr. L. Duncan Bulkley, 5 East 53rd Street, New York City, has been requested to issue a call to those especially interested in cancer to get together and form such an association. It has been decided to hold this organization meeting in San Francisco, doing the meeting of the American Medical Association, June 25-29. At this time, the plans, scope, details, and name of the association could be worked out and the organization effected.

Even if you cannot attend the organization meeting, please advise Dr. Bulkley, at the above address, if you are in sympathy with the work and would accept membership in the Society when it exists.

Dr. and Mrs. Edwin B. Claybrook,

Cumberland, Md., recently visited relatives in Richmond.

Surgeon General Hugh S. Cumming,

Of the U. S. Public Health Service, by invitation addressed the Woman's Club of Richmond, Va., on April the 30th. His talk related to the part the Federal government should play in the direction of health work in the various states. He paid high tribute to Virginia's chief health executive, Dr. Ennion G. Williams, and to Dr. E. C. Levy, director of public welfare of Richmond, and their co-workers.

Dr. A. D. Tyree

Has moved from Fireco, W. Va., to Clifton Forge, Va.

Dr. Newton G. Wilson,

After practicing for sometime at Fieldale, Va., has located at Hendersonville, N. C.

Statistical Data Concerning Personnel of Medical Corps of Army.

In a recent issue of *The Army Medical Bulletin* appeared an article on the above subject which was of more than passing interest. In this it is noted that the average age of Colonels of the Medical Corps of the Army is 53.3 years; of Lieutenant Colonels, 47.7 years; of Majors, 40.1 years; and of Captains and Lieutenants 36.6 years.

The University of Pennsylvania has the honor of having furnished more medical officers in the Army than any other medical school: Jefferson Medical College holds second place, with the University of Maryland and

the University of Virginia in the third and fourth places, respectively. The University of Virginia has 45 medical officers now in the Army, and the Medical College of Virginia 15.

As to the state of nativity, Virginia holds third place, with a total of 62 native Virginians in the medical service of the Army. Pennsylvania and New York hold the first and second places with 111 and 99 representatives, respectively.

Dr. and Mrs. B. M. Rosebro

And several friends, of Richmond, motored to Sweet Briar College, where their daughter is a student, to attend May Day exercises.

The Medical Society of the State of North Carolina

Held its annual meeting in Asheville, in April, with a very large attendance. Dr. J. V. McGóugan, Fayetteville, was elected president for the ensuing year, and Dr. L. B. McBrayer, Sanatorium, was re-elected secretary-treasurer.

Dr. Frederick W. Rankin,

Formerly of Mooresville, N. C., but recently of the Mayo Clinic, has been appointed professor of surgery in the University of Louisville, Medical School.

Dr. and Mrs. S. E. Weymouth,

Callao, Va., left the middle of April for an extended visit to Baltimore and points farther north.

Improvements at Pine Camp, Richmond.

With an appropriation of \$125,000 from the city and a gift of \$15,000, extensive improvements are being made at Pine Camp, Richmond's municipal tuberculosis sanitarium. The new buildings and changes in the old sanitarium are about complete and the result is that in the late summer, Richmond will have possibly the best municipal tuberculosis sanitarium in the United States. When completed, there will be accommodations for ninety-two patients instead of thirty-six, as at present. Dr. E. C. Levy, director of Public welfare, of Richmond, has been active in his work for the success of this institution. Dr. W. Nelson Mercer is chief visiting physician and is assisted by Drs. P. D. Lipscomb, G. A. Ezekiel and Wyndham B. Blanton as associate physicians, while

the consulting staff includes Drs. Dorsey G. Tyler, W. L. Mason, Henry S. Stern, R. Finley Gayle, J. Blair Fitts, Thos. S. Wheeldon, Ward H. Cooke, Joseph Bear, and J. L. Tabb, Jr.

Pine Camp established in 1910 and was first sponsored principally by the ladies of Ginter Park. The city took over the camp in 1915 and, since that time, improvements have been made as rapidly as finances permitted.

Medical Examinations for Golfers.

Dr. Matthias Nicoll, Jr., Deputy Health Commissioner of New York State, himself an enthusiastic golfer, in a bulletin issued recently states that there is no question that "golf may be and often is overdone." He accordingly suggested a few rules, applicable especially to the older golfers, and states that any one who can afford to play golf should be able and willing to pay for an annual scientific medical examination. There is no doubt of the fact that Dr. Nicoll's views should receive a recognition which the golf enthusiast may hardly wish, on first thought, to accord them.

The American Gynecological Society

Is to hold its annual meeting at Hot Springs, Va., May 21-23, under the presidency of Dr. John Sampson, of Albany, N. Y. Dr. A. H. Curtis, of Chicago, is secretary.

McGuire Cot at Hospital.

In memory of the late Dr. Edward McGuire, of this city, a cot was installed at Crippled Children's (Dooley) Hospital, Richmond, on the afternoon of May 8.

Dr. and Mrs. John A. Gibson,

Leesburg, Va., returned home about the first of May from a visit to Victoria, Va.

The Valley Medical Society

Meets in Winchester, Va., May 31. Dr. Hunter H. McGuire, Winchester, is president, and Dr. A. F. Roberston, Jr., Staunton, secretary.

Dr. Payne to be Virginia Epidemiologist.

Dr. Geo. C. Payne, of the International Health Board, has been appointed Virginia Epidemiologist and will shortly enter upon his duties in this State. He will, however, retain his connection with the International Board, coming to Virginia through the courtesy of that organization. Dr. Payne is at present doing post-graduate work in the Johns Hopkins

School of Hygiene and Public Health and will come to Virginia immediately after securing his degree as Doctor of Public Health, in June.

Undergraduate School of Nursing at Yale University.

The first university undergraduate school of nursing in the United States is to be established at Yale University, New Haven, Conn. The school is to have its own dean, faculty, buildings and budget, and the funds for its maintenance will be provided by the Rockefeller Foundation. It is planned to have the course cover about twenty-eight months.

The Virginia Public Health Association

Was reorganized at a meeting held in Richmond on April 17. Dr. W. B. Foster, Roanoke, the former president, presided. Dr. P. S. Schenck, Norfolk, was elected president; Dr. Roy K. Flannagan, Richmond, and Dr. W. S. Keister, Charlottesville, vice-presidents; Dr. L. L. Roper, Portsmouth, secretary-treasurer.

Over 300 persons actively interested in health problems throughout Virginia have signified their intention of joining the Association. Two meetings will be held each year.

Doctors in Virginia National Guard.

The Federalized National Guard of each State now constitutes, with the regular army, the first line of defense of our country and, as evidence of their patriotism and belief in preparedness for a national emergency, the following Virginia physicians have been commissioned in the Virginia National Guard:

In Richmond, Col. J. Fulmer Bright, Majors W. Nelson Mercer and John Blair Fitts, Captains Thomas F. Wheeldon and Ernest T. Trice.

In Danville, Major Henry A. Wiseman, Captains Clyde L. Bailey, Claude N. Rucker and Garnett W. Johnson.

In Norfolk, Captains Harry W. Boice and Albert V. Crosby.

In Roanoke, Captain Ira H. Hurt.

In Lynchburg, Captain James R. Gorman.

In Petersburg, Captain Herbert L. Wyatt.

Dr. Louis L. Williams, Jr.,

Who has been engaged in malaria control work with the Virginia State Health Department, has been designated to represent the United States on the epidemic committee of the league of nations. Twelve countries will be represented on the committee. Dr. Wil-

liams left the first of this month for Italy, where he will spend four months studying malarial problems.

Medical Aid Needed for Russia.

An appeal comes from the American Medical Aid for Russia for food, clothing, instruments, supplies and medical books for the physicians of Russia, as well as for financial help to maintain their hospitals and help care for the complicated health problems of that country. Dr. Henry O. Eversole, a member of the Commission on Russian Relief, has sent advance information on the report of the Health Section of the Commission, showing that conditions are deplorable and help is badly needed. Great effort is being made to control epidemic diseases which are ravaging that country, but one of the most serious problems which confronts the medical profession is the care of millions of children whose health has been damaged by adverse social and economic conditions. Hospitals have been taxed to the utmost to meet epidemic situations and there is now a great lack of necessary equipment and supplies. Dispensaries which are running are hampered by lack of even the simplest drugs.

Some of the best known medical men in the United States are members of the Physicians' Committee of the American Medical Aid for Russia and endorse its work. Supplies or money should be sent this organization at either 1521 Cherry Street, Philadelphia, Pa., or 108 Dobbin Street, Brooklyn, N. Y. The American Medical Aid for Russia promises to apply all contributions to the relief of Russian institutions and medical personnel, without deduction for administration and transportation charges.

Course in Physiotherapy.

The next course in physiotherapy which will be given at Walter Reed General Hospital, will begin October 5, 1923, and continue for four months. For information apply to the Commanding Officer, Walter Reed General Hospital, Washington, D. C.

The American Congress on Internal Medicine,

Which convened in Philadelphia, April 2, elected Dr. Elsworth Smith, St. Louis, president, and re-elected Dr. Frank Smithies, Chicago, secretary-general.

Civil Service Examinations.

Examinations will be held throughout the country on June 6, for men and women, to fill vacancies for trained nurse and trained nurse (psychiatric), in the Panama Canal Service. Full information and application blanks may be secured from the U. S. Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. Civil Service Examiners at the postoffice or custom house in any city.

Incidence of Diphtheria in City and Country.

From investigations recently made by Dr. C. W. Kidder, of the U. S. Public Health Service, the following conclusions are deduced: that the susceptibility to diphtheria is higher among persons living in rural sections than among those living in cities; that it is much higher among the well-to-do than among the poor; and is more often found among the native born than among the foreign born. In view of the above, the Service stresses the value of the Schick test in determining those who are susceptible, thus enabling them to be immunized by the toxin-antitoxin. Particularly should this be a routine in the rural regions, where the degree of susceptibility was found to be greatest and where facilities for prompt and adequate treatment are frequently lacking.

Dr. J. Gordon Boisseau

Has been named post commander of Post 151, American Legion, organized in Richmond, Va., early this month.

The Virginia State Dental Association,

At its annual meeting held in conjunction with that of the North Carolina Dental Society at Pinehurst, the first part of this month, elected Dr. C. B. Gifford, of Norfolk, president, and re-elected Dr. Harry Bear, Richmond, secretary-treasurer. The Virginia Association will hold its next meeting during the Spring of 1924 in Norfolk, Va.

New Hospital at Stuart, Va.

Dr. George T. Divers has placed contract for a new hospital to be erected at Stuart, Va., on the site of the Mother's Home, which was owned and operated by the late Dr. R. S. Martin. The building is to have four stories, will be modernly equipped and fireproof, and will have a capacity for thirty patients. It is expected that it will be ready for occupancy in August.

Dr. L. T. Royster,

Norfolk, Va., was elected one of the vice-presidents of the Virginia Conference of Social Workers, recently held in Charlottesville, Va.

Dr. M. H. Eames,

Lanexa, Va., was a recent visitor in this city.

Broadcasting Public Health by Radio.

The radio has now become a popular means of disseminating public health information. It is stated that broadcasting stations are so situated as to serve practically every portion of the United States. It is estimated that there are now more than 2,000,000 radio receiving sets within range of stations which release health bulletins. In this way health news is scattered with practically no additional expense to the Public Health Service.

The American Drug Manufacturers

Held their twelfth annual meeting in New York City, April 16-19. Important matters relating to narcotic drug regulations, legislation, pharmaceutical progress, scientific research, medicinal chemicals, etc., were discussed. Mr. A. S. Burdick, President of the Abbott Laboratories, Chicago, was elected president, and Mr. A. Homer Smith, of Washington, D. C., Secretary.

Deaths of Physicians.

The Journal of the A. M. A. reported deaths of 2,513 physicians during 1922, and, adding three per cent. for possible omissions or delayed reports, it is estimated that the total was 2,588. This rate of 17.73 per thousand was slightly higher than the 15.52 per thousand average for the previous twenty year period. The greatest number of deaths for a given age was at 66 years, at which age eighty-eight deaths were noted, and the largest number were due to diseases of the heart and circulatory system.

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Obituary

Dr. McGuire Newton,

Distinguished pediatricist and one of the most beloved doctors of Richmond, both by the profession and his clientele, died May 8th, after an illness of about seven months. His death was due to unusual heart complications accompanying inflammatory rheumatism. He was a son of the late Bishop John Brockenborough Newton and Mrs. Roberta Page Williamson Newton, and was born in this city 47 years ago. He graduated from the University College of Medicine, Richmond, in 1897, and joined the Medical Society of Virginia in 1898. Several years later he decided to limit his work to pediatrics and he had become one of the leading specialists in this branch in the country.

Dr. Newton was for some years professor of pediatrics at the University College of Medicine and, when that school combined with the Medical College of Virginia, he was placed in charge of the same branch in the consolidated schools. He was active in church and charity work, was an ex-president of the Richmond Academy of Medicine and Surgery, was a vice-president of the Medical Society of Virginia in 1910, and later a member of its executive council. He was also a member of the State Board of Health. He was prevented by the condition of his heart from entering the medical service during the World War, but continued his work at home with patriotic zeal. He was unmarried but is survived by a sister and several brothers.

Dr. Samuel Lile,

A prominent physician and surgeon of this State, died suddenly at his home, Lynchburg, Va., April 15. Dr. Lile was about sixty-two years of age and had practiced in Lynchburg for about twenty-five years. He studied medicine at the University of Louisville, from which he graduated in 1888. He joined the Medical Society of Virginia in 1894 and was much interested in its welfare, having been elected president in 1914. He was also an active church worker. Dr. Lile is survived by two daughters, his wife having died several years ago.



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OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Fifty-fourth Annual Meeting, Roanoke, October 16-19, 1923.

Vol 50, No. 3.
WHOLE No. 852.

RICHMOND, VA., JUNE, 1923

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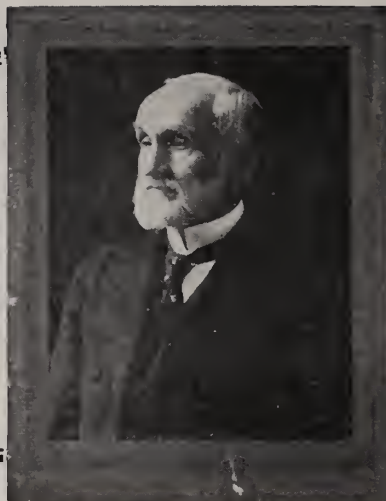
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Original Communications

ABDOMINAL PREGNANCY.*

By J. BOLLING JONES, M. D., Petersburg, Va.

Though rare, with more frequent reports from year to year of cases of abdominal pregnancy, successfully handled both as to mother and child, the subject certainly demands some consideration at the hands of surgeons and obstetricians. It is evidently wise that all such cases be reported with results. The cases being rare, one can only be safely guided by the experience of others as well as his own, both as to diagnosis and treatment. I will not attempt to enumerate the number of cases that have occurred with living children in recent years. Horsley, in 1912, found in reporting a successful case of his own 138 babies living at time of operation. Forty-six of these had occurred in the previous fifteen years against 92 prior to 1897. Of the last 46 reported, 19 were still doing well at the time the report was made, and in many instances the children were over one year old. Eight were deformed and, as a rule, died early, 19 showed normal development but died in a few hours from various causes, such as prematurity, convulsions, bad surroundings, or some bad general conditions of the mother. No doubt with an improved diagnostic acumen and surgical technique, as we have today, a search of the literature of recent years would show a larger number of successful results; not that any more cases of abdominal pregnancy occur. The reverse should be true. With the exception of a few instances all abdominal pregnancies are of the secondary variety. There is usually a definite history of rupture in the early months. Most patients today are seen by some one capable of recognizing the true condition at the time, proper advice given, operation promptly done and no chance for

abdominal pregnancy to develop. These were the facts in the living baby I am reporting except that the mother refused the early operation. In a series of twenty cases of ruptured ectopic, all successfully operated on by me, there was another abdominal pregnancy of about four and one-half months. Who can tell what would have happened in the other eighteen had they not been operated on early, some just before, the others soon after rupture. I certainly would not advise any woman to take such a hazardous risk, however. The four and half months pregnancy was a poor colored woman. While there was a history of attacks of severe pain and faintness on former occasions, she had been seen by no physician until the day on which she was operated.

Diagnosis may be extremely difficult or very easy, depending upon the stage of development. Here, as elsewhere, mistakes will be seldom made if we have it in mind. Discrimination must be made between this condition and any intra-abdominal growth.

Pregnancy of this type will produce the same general picture as one perfectly normal. The menstrual history is particularly suggestive. It may be absent, irregular, scanty or too prolonged and profuse, with the passage of tissue, a history of at least much pelvic discomfort, and usually one or more periodic attacks of extreme pain attended by nausea and faintness of greater or less severity. With this early history we find, on physical examination, conditions depending upon the stage of development of the pregnancy. In the early months the abdomen will be enlarged below to right or left, and of smooth contour. The growth naturally will be higher and more in median line with the advance of pregnancy. At or near term there is little difference in its appearance from the normal. Uterine souffle occurs very much earlier than in a normal pregnancy, and will be a distinct guide long before the foetal heart sounds and foetal

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movements are felt; once heard and felt, foetal heart sounds and foetal movements are more distinct than in the normal cases. On vaginal examination a mass will be found high up to the right or left, with uterus separate, somewhat enlarged, and pressed down to the opposite side. The findings in the pelvis will remain the same throughout. In the early months differential diagnosis is more difficult. The peculiar menstrual history, location of the growth, empty uterus, general pelvic discomfort, early appearance of the uterine souffle, would be guiding points. The main point in the early stages is, to my mind, not to misinterpret signs of rupture. This was my experience in the four and half months' pregnancy to which I have already referred. A diagnosis of ectopic with repeated ruptures was made; whereas at operation there was no blood in the abdomen, the foetus was in a perfectly formed glistening sac which ruptured when attempt at removal was made. The placenta was attached to the lateral wall of pelvis, underneath the broad ligament. Its vessels were ligated, and removal was without much difficulty. Remembering this mistake, I was the better able to handle the successful case now being reported. In the later months, if the child be viable, differential diagnosis is easy.

With the foetus dead, the X-ray would be an absolute guide. When in doubt, these cases should be watched and studied in the interest of both mother and child.

Treatment will depend on the stage of development, whether the foetus is dead or alive, and the general and local condition of the patient. The operative danger arises mainly in handling the placenta, and this is proportionate to the location and relatively vital structures to which it is attached, and not necessarily to the term of pregnancy. It is also well recognized that, in case of the foetus dying at any stage, changes immediately take place in the blood supply to the placenta, making the matter of its removal very much easier and safer: particularly if a period of a few weeks is allowed to elapse before the operation is undertaken. Consequently, in an advanced case, the foetus dead and the above changes having had time to occur, a section is indicated, removing the foetus, the placenta and membranes, with complete closure. With the child alive, or if recognized before time of viability, the mother's general condition good

and local condition not alarming, other considerations arise. In my judgment, these infants deserve to be considered just as they would be in threatened abortion. It has been proved by Cragin, Horsley, and by the case I report, that they can be perfectly normal in every way. These patients should be kept under the strictest surveillance. It might be slightly safer for the mother than for the child, to operate early, but this is questionable. In my cases the one at eight and one-half months was operated on as safely as the one at four and one-half. When the pregnancy is advanced, the danger of hemorrhage from rupture as in the early months is practically nil. Should the sac rupture with escape of amniotic fluid in the abdominal cavity along with the foetus, to my mind the shock would not be proportionate to that of hemorrhage. Under these conditions, of course, operation should be immediate. I have not read of such an accident occurring late, if handled promptly, as being disastrous.

According to Beck's statistics the best time to operate in the interest of the child is the thirty-eighth week. This was the plan we adopted in the case we today report. The mother's condition was good up to that time.

The question next arises how best to handle the placenta with the active blood supply. This is left to the judgment of the operator. Beck proved by experiment with dogs that three-fifths of the human sterile placenta could be handled readily by the peritoneum. He has collected a series of twelve cases where the child was removed, the cord cut close to placenta, the latter with its membranes left *in situ*, the abdomen closed without drainage. The mortality was a little over 33% as against the next and usually adopted plan of procedure, that of marsupialization, which carries a mortality of 39 per cent. It has been suggested this is probably not a fair test, as probably in a good many of the cases of marsupialization the operator had possibly attempted removal and, having failed, the patient had to stand the effects of the hemorrhage in attempts at removal as well as the long continued suppuration that goes with this method.

When, in the judgment of the operator, the placenta by virtue of its attachment can be safely removed, this should be done. This plan was adopted in both of my cases, both recovering.

Patient of Dr. F. J. Wright, Petersburg, Va.

Mrs. W. H. C., white, age 29, married 11 years, two children, first born in 1912, still born. In 1913 had laparotomy, median incision, removing right tube, ovary and appendix. In 1915 last child was born, forceps delivery. Since that time health fairly good. Menstruation regular but varied in amount and discomfort. The last regular menstruation was March 17, 1921. Present illness begun April 12, 1921, with severe pain in the rectum, extending through to front of lower abdomen, and lasting about fifteen minutes. No nausea, vomiting or fainting. About two weeks later, while at stool, the same character of pain occurred, but more severe, lasting a little longer, causing a feeling of faintness but no vomiting. About May 1st, the third attack occurred, and she was seen by Dr. Wright. There was pain in rectum and lower abdomen, very severe and persistent, causing thirst, nausea, blindness, air hunger and syncope. She was then in bed constantly for five weeks. The patient missed the April period due the 17th. Early in May begun menstruating and continued till June 8th. During May she suffered with intermittent cramping pains in the abdomen. They also disappeared about June 8th. On May 26th case was first seen by me with Dr. Wright, who suspected ectopic. This opinion was confirmed, based upon the typical history already given and pelvic findings, namely, a fixed mass to left of uterus, soft and elastic. Uterus quite tender and soft. There was no temperature. Immediate operation was advised but refused. On June 7th she was seen by another physician who questioned any form of pregnancy. He advised curettement which she also refused. On July 24th, two months later, she was seen the second time with Dr. Wright. The patient's general condition was then good but she had noticed her abdomen enlarging on one side and was concerned about herself. The growth then occupied the lower left abdomen and could be outlined above easily. Uterine souffle was loudly audible over the tumor. Digitally it was shown that the left side of pelvis was completely filled with a soft fixed growth. The uterus was easily defined to right but fixed; somewhat enlarged. All of the patient's functions were being well performed and vital organs in good condition. The patient was advised that the opinion given her two months

previously was correct; that nature had taken care of the situation to the extent of controlling hemorrhage, but that the foetus was alive and was growing. In view of the fact that her general condition was good, she was convenient to hospital care, and could be quickly handled in case of emergency, in the interest of the child we would await developments. I did not fear hemorrhage any further. She was from then on constantly under Dr. Wright's care; I saw her occasionally. Early in August, foetal movements were active and foetal heart could be heard.

On August 13th, patient had a severe fall. This was attended by marked abdominal pain, faintness and nausea. Fearing rupture, she was promptly sent to the hospital by Dr. Wright. When seen by me a little later, the picture did not look like shock from perforation but that from pain. Moreover, I remembered my first case referred to, where I made an error of judgment and consequently lost the baby. Her pulse was slow but of good volume. There was little anxiety in expression; considerable nausea; temperature normal; surface slightly cold, but soon responded to heat. There was extreme tenderness over the abdomen. Singularly, the foetal heart sound which had been distinct could not be found. The uterine souffle which had been extremely loud was very faint, there was extreme tenderness over the abdomen. What I feared was death of the foetus. The only drug administered was morphia to relieve pain. In 24 hours the patient's general condition improved, the foetal heart sounds were again distinct and souffle as pronounced as ever. She stayed in the hospital under observation twelve days and left in good condition.

From then on there was nothing unusual in behavior of the patient, only the necessary increasing enlargement of abdomen, the growth getting more in middle line, the increase in strength of foetal movements and heart sounds. We fixed the end of the 38th week to be about November 9th, taking this as a most propitious time for the child and as well for the mother. During these last weeks the case was properly safeguarded from an obstetrical standpoint.

Mrs. Cook entered the hospital November 8th and was prepared for laparotomy in the usual manner. Just prior to operation she was carefully gone over. Heart, lungs, blood pressure and kidneys were all normal; nutrition good; foetal heart sounds strong and move-

ments active. The tumor reached close to diaphragm, situated a little more to left of abdomen. On percussion, the entire left side was flat except an area of tympany extending from the left anterior superior spine upwards and over top of tumor. Otherwise, tympany only existed on extreme right in region of flank. Taken to operating room at 11:55 a. m., was back in room at 1:45 p. m. Time of operation one hour, thirty minutes. Anesthetic ether; anesthetist, Miss Spencer. Assistants in operation, Drs. F. J. Wright and F. Hinchman. The abdomen was opened and incision made through left rectus, extending from level of umbilicus to just above pubis. The left broad ligament was found spreading out over tumor as high as middle of incision. There were no adhesions at any point to abdominal wall, except small omental adhesion to old scar in middle line and independent of present condition. The placenta could be easily seen occupying the upper portion of sac and extending down on the left to the level of overlapping



Margaret Bolling Cook. Abdominal pregnancy baby, aged 11 months, 11 days.

broad ligament. On retracting abdominal wall to right, a clear thin portion of sac presented just under the middle line. Gauze padding was applied and the sac opened at this point. Amniotic fluid was abundant and apparently perfectly normal. The child was quickly extracted in perfect condition, in a few minutes' time crying lustily.

The cord was clamped and cut close to the placenta. On the removal of the child and amniotic fluid, the placenta immediately came down in easy access to field of operation. It was entirely arched over by the sigmoid, receiving its blood supply from the meso-sigmoid and left broad ligament. On picking up the sigmoid with the tissues now relaxed, it was

found that ligatures could be placed between the two. Complete enucleation was determined and accomplished without much difficulty. The upper half of broad ligament was removed with its enormously distended vessels. A small portion of membrane was quite densely adherent to the large iliac vessels. Fearing hemorrhage from this source in its removal, this small portion of membranous tissue was ligated and left *in situ*. Otherwise, the entire placenta and membranes were removed. The hemorrhage was at times considerable but at no time alarming. The uterus was pressed down below and to the right and was considerably larger than normal. I made no attempt to demonstrate the tube on the affected side. The abdomen was closed without drainage. The patient left the table in good condition. The baby, a girl, weighed four and three-quarter pounds, and was in apparently perfect state of development. Post-operative treatment was the same as in any abdominal incision. Salines by hypodermoclysis were given on account of the fact that we did not care to interfere with rectum or sigmoid. There was considerable uterine bleeding beginning soon after operation. It was as if it were an excessive menstrual flow. Patient's recovery was uneventful except after four or five days she ran a low grade temperature that we were unable to account for. My impression is that it may have been due to a mesenteric phlebitis. The kidneys acted well and bowels moved well by enema. There was little secretion of milk which made it necessary to feed infant artificially. The patient left hospital November 26th, in ambulance, but was soon up and around. The mother today, 11 months and twenty-four days after, is in perfect condition. A report of Dr. Mason Romaine, pediatrician, shows the baby to be perfectly normal mentally and it is physically above the average in development.

DISCUSSION.

Dr. W. E. ANDERSON, Farmville: I want to congratulate Dr. Jones on the beautiful outcome of his case.

It has always seemed strange to me, how much a woman's abdomen and reproductive organs can stand. I had a case similar to that of Dr. Jones, only the woman carried the child for twenty-two months. She was a very big, stout woman, and she came a long ways across rough country roads to consult me. She arrived in pretty good condition.

The abdomen was so very thoroughly distended that I could not make a very thorough examination. I thought at first that it was an abdominal tumor and decided that it was too big a case for me. I referred her to Dr. Stuart McGuire, of Rich-

mond. The second day she went over to Richmond, and made the trip in perfect comfort. I went down to the operation. The whole staff of the hospital examined her, and no two agreed as to what the trouble was. One said it was a cyst. I said that she had abdominal tumor, the size and proportions of which I could not say.

We made the operation, and the first thing that popped out was the foot of a large child. We extracted the child and it weighed ten pounds. The patient said that she had not menstruated for twenty-two months and had considered herself pregnant. She had had twelve children before this. This may account for this condition. The woman made a good recovery and has not reproduced again.

I have seen cases of abdominal pregnancy and rupture, but I have not known any of them to die, if handled carefully.

DR. G. B. BYRD, Norfolk: Dr. Jones' case interested me because I have had some cases of abdominal pregnancy. I was not fortunate enough to get to see the patients until the sixth, ninth, tenth and eleventh months. Some of these were cases of abdominal pregnancy, some of extrauterine pregnancy. In the findings of these cases they give more or less the same history. They have been sterile until then, or they are rather late in reproducing, or they have had several years of sterility. All complained of pain in the pelvis, at one side or the other. Each was of the opinion that there was a possibility of her being pregnant.

In following up from time to time during the early months, I find that these patients do not enlarge as rapidly as you would expect them to at that stage. Each had a definite mass or tumor to be felt on one side or the other of the uterus. In the last three, after it was decided that the mass was increasing, they were advised to have an operation.

A patient I had gave a history of pregnancy, and she had been going to the doctor for two or three months, and had already engaged him to attend her in her confinement. I do not know whether he made a vaginal examination, but I assume that he examined the urine. About the eight and a half or ninth month, she had some pain in the pelvis, and sent for him, thinking herself in labor. He did not find any dilatation of the cervix, and told her that he did not think her in labor. That went on for perhaps a week. He saw her six times. The pain stopped and she was all right, although the tumor was still there.

When she was admitted to the hospital and I examined her, you could get a definite mass that felt like a baby, but was more freely palpable. We could not get any heart sounds. The operation was performed and the child weighed ten pounds and four ounces. The placenta was attached to the ovary and came away easily. The child was in perfect condition. I fully believe that during her period of discomfort this woman had been in a position to have an abdominal operation performed.

DR. M. P. RUCKER, Richmond: I would like to ask that Dr. Jones say a few words in the description of the placenta and something about the length of the baby. His baby weighed four and one-half pounds. You would expect a larger baby at thirty-eight weeks. I would like to know whether he thinks it was the condition of the placenta or the interference with circulation that was responsible for the retarded growth of the baby.

DR. GEORGE T. MYERS, Norfolk: I think that abdominal pregnancy or extrauterine pregnancy requires all the skill of the obstetrician in making a diagnosis. Like a clap of thunder out of a clear sky are those cases in which this complication occurs in many cases.

I saw a woman about three months ago who was about the menopause; she had been menstruating regularly every twenty-eight days. At the time I saw her she had acute pain in the right side, no bleeding. I did not think that she had extrauterine pregnancy. It requires an astute diagnostician to recognize every case of tubal pregnancy before rupture. I diagnosed it as appendicitis. I decided to wait until the morning before operating. In the morning she was having extreme pain in the right side, and was passing a considerable amount of blood; this changed the original diagnosis. She was taken to the hospital and, when we opened the abdomen, we found it filled with blood, and a two-and-one-half months' foetus. We sewed the abdominal wound without drainage, and she made an uneventful recovery.

I had another case taken practically the same way. From a vaginal examination I could not find anything extraordinary. I took her to the hospital and found the same condition at operation. In both of these cases the tube had ruptured. I think it important to bear in mind that when a woman who has menstruated regularly, whether around the menopause or sterile, if the patient has possibly skipped one month or is a few days over her period and is taken with acute pain in the abdomen with or without bleeding, you may expect extrauterine pregnancy.

The removal of the placenta depends on the individual case, and the site of the placenta. I believe it preferable to leave it if it is attached to the stomach, or a large part of the intestines. If it is left, or adherent, you have to take it out later at a more favorable time, and you will not have the severe hemorrhage to contend with. I understood Dr. Jones to say that in his case he sewed the abdomen up without drainage, leaving the placenta. Of course drainage has been discussed and talked against, but I still drain where the placenta cannot be removed at the time of operation.

Early recognition is the important thing to remember in cases of tubal and abdominal pregnancy, operating before rupture takes place if possible.

DR. J. BOLLING JONES, Petersburg (closing): Babies of this type have been carried in the abdomens of women for years. They are like big ovarian cysts. How they can be carried and not cause more discomfort is more than we can see. The foetus is dead yet there is no infection.

Dr. Byrd speaks of a case of his in which the foetus was dead and the true condition was not recognized until the abdomen was opened. If we bear in mind there is such a thing as abdominal pregnancy, I do not think one likely to overlook it. The main point is to discriminate between evidence of actual rupture at any stage of development, which would require immediate section, and certain minor disturbances of the abdominal brain simulating rupture and requiring no interference. I was guilty of this error, opening the abdomen and finding the sac intact with foetus alive at four and a half months. I feel sure that this pregnancy undisturbed would have advanced to a safe time for operating in the interest of the child as well as the mother.

Dr. Rucker speaks about the placenta and the length of the baby. I am sorry we did not measure the baby. The placenta was smaller than usual, though it seemed especially large to me at the time.

There was not much difference otherwise. The mother is quite a small woman, which would necessarily affect the size of the offspring to a great extent.

Dr. Myers speaks of the early operation in ruptured ectopic. Of course we advise this in every case. In the abdominal case here reported, the woman refused early operation. The placenta was entirely removed, hence the abdomen was closed without drainage.

PAINLESS LABOR.*

By R. L. RAIFORD, M., D. Sedley, Va.

The intense interest manifested in recent years by all prospective mothers in twilight sleep and other forms of pain relieving methods advocated or used during childbirth forces us to realize the absolute necessity of abandoning the old "watchful waiting" method of handling our obstetric work and adopting in its stead an "up and doing" policy in these cases. It is true that nature will, unassisted, bring about delivery in a large majority of our cases and that the skill of the attending physician may be really needed only in the abnormal cases, but it is growing to be equally true that he who sticks to this policy will sooner or later find that, to put it mildly, he is not popular with this class of patients. They do not hesitate to tell you, and rightly so we believe, that they sent for you to help them and not to sit around and look at them.

Man's inhumanity to the pregnant woman is shown by his apparent, if not real, negligence in the study of the more refined methods of the practice of obstetrics, for until very recent years it has been deemed by many of the profession as well as the public that nature could care for all except abnormal cases of delivery, thus debarring the general practitioner from the refinements of skill which constant caring for normal cases will lend to the handling of those that are difficult. Many doctors will tell you openly that they detest the practice of obstetrics and, as a natural consequence, they are not taking the interest in this work that would carry with it the ability to help make all cases less painful and exhausting and make the difficult and serious cases much less so.

If pain were eliminated from the world, much that is best in the medical profession would pass with it, for it is pain in its broadest sense that brings most of our patients to us—either the pain they are then suffering or the pain they are afraid they will suffer in the future.

We rarely see an expectant mother, especially among the better classes, who does not dread the ordeal that is facing her, and this dread is increased to actual fear in many primipara cases and in patients of a nervous disposition. Here we are dealing with women who are hypersensitized to pain and who are approaching long hours of the most intense suffering human flesh is heir to. Furthermore, they have had months in which to learn from their fellow sufferers the horrors of child-bearing. They have also had three or four months of nausea and several months of embarrassment and separation from society and their usual avocations because of their condition.

When we consider these facts, it is little wonder that there should be just cause for discussions among the leaders of our country concerning race suicide and kindred subjects. It is little wonder that the discussions of twilight sleep in our leading periodicals, though they be fantastic and impractical, should arouse the interest of every normal woman to the point of demanding better and more humane treatment during this most trying period of her life. And it is little wonder that the specialist who is handling obstetric cases wisely and intelligently and meeting the desires and needs of the patient is keeping busy in spite of the handsome fee he gets when those of us who are paying no attention to these refinements of practice have plenty of time to burn, but little money to spend.

It is claimed that in the average case "Painless Labor" can be about as nearly approached as the much vaunted painless extraction of teeth. If we make an analogy of the two cases by comparing the preliminary discomforts of pregnancy to the discomforts that lead up to the point at which it is deemed necessary to extract a tooth; the pains of early labor to the pains which accompany the application of the remedy to relieve the pain of extraction; and the well handled case during the second stage of labor to the actual extraction of the tooth, it can be seen that, bearing in mind the relative seriousness of the two operations, one may experience as little relative discomfort in normal labor as in the tooth extraction.

Since this paper is meant to deal primarily with the problems of the general practitioner, there will be no attempt to discuss methods that can be used only in a well organized and

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equipped institution. For this reason, since twilight sleep requires the constant presence of a trained attendant, and nitrous oxide oxygen must be given by means of apparatus that is not practical for him to use, we shall not discuss the use of these two methods of practice.

There is no doubt that the best method of making the expectant mother more comfortable is to gain, if possible, her perfect confidence. This can be done only by first becoming an intelligent and scientific obstetrician, and then by transmitting this knowledge of ability in a pleasant and unobtrusive manner to the patient. Frequent and painstaking inquiry as to the patient's health, careful and frequent analysis of the urine, correction of her ailments, if possible, however small they may be, and encouragement along the line of her ability to go through her confinement successfully, is the best way to build up confidence.

A sympathetic and firm handling of the case from the very beginning of labor pains, always keeping busy at something, if possible, while in the presence of the patient, never allowing her to get the impression that you are merely sitting around waiting for some complication to arise before doing anything, will cause a continuance of this confidence, and will often accomplish wonders in making your patient satisfied and comfortable. Some good men depend on this method entirely, but while it alone will act nicely in some cases, and will help immensely in all cases, we would hardly be justified in depending on this plan alone.

The drugs which have been used most successfully in alleviating pain during the first stage of labor are chloral, morphine, or morphine scopolamine combined. Most cases get on well enough not to require any treatment during this stage other than an occasional assurance that she is doing well. In others of a nervous or irritable disposition it will be well to give small doses of one or the other of these drugs as indicated. In some cases a little chloroform or ether during the latter part of the first stage, especially if pains are severe, the os rigid and dilatation slow, will not only make the patient immensely more comfortable, but will usually facilitate dilatation and thus hasten the progress of labor.

It is, however, at the beginning of the second stage of labor that the ability of the trained obstetrician has the chance to make a real home run. If called early in the case, it

will often tax the ingenuity of the most skilled physician to do enough to keep the patient satisfied that he is exerting his best efforts to help her, but after dilatation is complete and pains are strong and sufficiently frequent he should have plenty to do most of the time. Here the general anesthetic may be given with each contraction of the uterus, just enough to relieve the sharp edges of the pains but not enough to retard labor. This should be kept up until the head is well down on the perineum when it should be pushed to complete anesthesia, allowing the baby to be born without the consciousness of the mother.

In cases where the pains are not sufficiently strong unassisted we may, after dilatation is complete and if we are sure there is no mechanical obstruction, give small doses of pituitrin as indicated, to give tone and strength to the uterine contractions. But before giving this drug, we should always be prepared to give an anesthetic as needed, to hold the pains under proper control, for there is little doubt that the precipitous labors we hear about are due to the fact that the rapid action of pituitrin is not properly tempered by a skilful administration of chloroform or ether. After giving pituitrin the usual management in this class of cases is the same as in cases where pains are normally strong enough without its use.

By the careful use of chloroform or ether and pituitrin, if necessary, we will in most cases be able to perfect delivery with the mother so thoroughly anesthetized as to be unconscious of the fact that the infant has been born. Often, too, the placenta can also be delivered before complete consciousness is regained and it is not unusual for the mother to ask, after she has been dressed and fixed up nicely in a clean bed, how long it will be before she will get through, and it is always most gratifying to have her smile and thank you for having assisted her in getting over the dreaded ordeal so nicely.

We need not dwell on instrumental or other special forms of delivery as this paper is meant to deal primarily with the normal case. Potter's method which is designed to bring about delivery at a specified time by means of bags and podalic version may be used by one skilled in its methods and under proper conditions, but the method outlined in this paper is so simple and easy to practice that it may be used in any backwoods cabin with success.

When the general practitioner has given the question of obstetrics the thought and study due it, and acquired the skill to handle the normal case in such a way as to give the unqualified impression that he has given value received for the fee he gets for his services, the midwife problem will be largely solved. Let us always bear in mind that it is not the desire to save money alone that causes our women to have a midwife to attend them during confinement, but largely the idea that we have, through our negligence, allowed to become prevalent that in normal cases the midwife can be of about as much help as the doctor. All the abuse and criticism which can be heaped on the poor midwife who, in the present arrangements of society, seems to be with us as a necessary evil will have but little effect on her present status, for we may just as well sooner as later face the irrevocable fact that more intelligent and efficient service from the general practitioner in the normal case of obstetrics will be the ruling factor in solving this troublesome problem.

In conclusion, let me say that he who dons the garb of a practitioner of medicine, the highest calling save that of the ministry which it is our privilege to follow, and does not equip himself to relieve the suffering of the parturient woman in every possible manner in which he is capable, is guilty of the grossest neglect. To argue that labor is a natural process which demands no interference, except when an abnormality arises, should have about the same bearing as to say that our forefathers dwelt in caves, wore skins for clothing and ate their food uncooked. We must ever bear in mind that we are dealing with highly sensitized and often nervous women, the product of modern civilization, and, if we do our duty as obstetricians in such a manner as to gain their unqualified confidence and appreciation, we must treat them not as her forebears of medieval times but as what she is today. As a parting thought let me say that more scientific attention to the normal case of labor will not only be rewarded by the lasting gratitude of the patient and a better income for the physician, but will better qualify us to handle our difficult cases with more skill and better results.

DISCUSSION.

DR. R. B. JAMES, Danville: Dr. Raiford, in referring to "Twilight Sleep," stated that it was neces-

sary to be on hand all of the time. I do not think that this is necessary.

I remember a case I had of a young woman with her first child, and, after getting her quiet and asleep, I went on into the next room and went to sleep. I always give adalin tablets. I find these very effective, and I think it a good thing. If you give her a hypodermic she will go on to sleep. Then if she makes more noise, give her some more. I do not see the necessity of being with her all of the time. To hold off the pain and let her go to sleep is better than to be watching all of the time.

If a woman goes into labor at ten p. m., and is not through until six o'clock the next morning, it takes a lot of ingenuity to find something to do all of that time.

DR. J. BOLLING JONES, Petersburg: I presume that a great many men do a lot of obstetrics. Personally, I have not done a large amount, but I have never had any more loyal patient than the woman I have delivered of a child. Deliveries can so easily be made practically painless.

In the operating room at the hospital (we have our delivery rooms near the operating rooms), and frequently when I am operating, I hear the screams of a woman being delivered of a baby, and I think how easy it would be to make that delivery painless.

I think Dr. Raiford is right when he says that it should be made painless. In the first dilating stage, I use a compound of chloral, bromide and mercury, with nearly one quarter grain of morphine. I do not hurry the labor, but give her plenty of time, and keep assuring her that I am going to make the labor painless.

Remember two things: you are to make it painless, and if she cannot have the baby, you can.

DR. W. E. ANDERSON, Farmville: I was impressed very favorably with Dr. Raiford's paper.

I just want to emphasize the point he made of keeping the confidence of the woman in labor. Primary to labor, I think it a good idea to have her in good trim, and keep assuring her that when the time comes you are going to see her safely and easily through.

I prefer chloral to morphine. I think the morphine hypodermic quiets the woman, but it postpones labor. I do not often find that they vomit the chloral. If she does vomit the chloral, I use chloroform, just enough to get the patient quiet. I find that chloral keeps the woman in a frame of mind to go on and have the baby.

DR. G. B. BYRD, Norfolk: Anesthesia with labor has always been a sort of hobby with me.

I think every woman ought to have as much relief at this time as she can get. It has been my custom to use nitrous oxide as a routine measure, not only in the hospital, but in the home. I think it depends on the training you have had in reference to nitrous oxide, if you use it. I give just enough to relieve pain. It has been my custom to give a dose of morphine when the patient begins to be uncomfortable. It does not retard labor. I believe it is a little quicker following a dose of morphine than if they did not get it.

The amount of morphine I use depends on the size and temperament of the patient. I had rather use small doses often, than to use a large dose. I usually use six milligrammes. Then you give the nitrous oxide, and the patient will go through it well, and come out in a frame of mind not to mind having another baby.

DR. R. L. RAIFORD, Sedley (closing): I wish to thank most heartily all the gentlemen who have spoken so kindly of the manner in which I tried to handle the subject in question. We do not find many men doing what Dr. Byrd says he does.

What I wanted to particularly impress on you, is to do what you already know how to do, instead of neglecting it.

NASAL ACCESSORY SINUSES AND OPTIC NERVE DISTURBANCES.*

By J. E. DIEHL, M. D., Norfolk, Va.

It is not my intention to discuss at length the various theories as to the effect of sinusitis in relation to optic nerve disturbances, but to confine my remarks to what I have found in my own cases, with a slight review of some of the literature. So what I may have to say is offered as an opportunity for discussion, and not with the idea of adding anything of material value to the subject.

There has been a great deal of literature written on this subject during the past few years, and I find on a careful review of the subject, that there is a remarkable unanimity of opinion among most of the writers as regards their findings. It is rather unusual and unique to find this harmony among a large number of enthusiastic workers.

If the close proximity of the posterior ethmoids and sphenoids with the optic nerve and also the close relationship between the vascular systems have any bearing in optic nerve disturbances, then the question naturally would confront us, how is it that the optic nerve is not involved more frequently in sinusitis, especially when we find nasal pathology well established? From what I can understand, the optic nerve is not involved so frequently in those cases where we find rather manifest pathology on inspection, which is usually confirmed by a roentgenogram and at times by the transillumination, but more often in those cases where the nasal pathology is more obscure and rather ill defined. This statement of course, does not hold true in all cases, but the tendency is fairly well established by those who have wide experience, and they offer evidence to prove their contention. I believe the early writers considered the close proximity of the sinuses to the optic nerve as the most plausible explanation of eye disturbances, but they did not offer anything more than this fact. From this view they have brought forth a number of well founded and explained etiologi-

cal factors. It is fairly well established that the more gross the nasal pathology the less apt are we to find eye disturbances and conversely, the less nasal pathology we find, the more apt are we to find eye disturbances. It is difficult to see why this should be, but this does not alter the situation one way or the other. Does the microscopic pathological picture throw any additional light on this subject? From the standpoint of pathology, both gross and microscopical, but little information is obtained. If the pathologist can enlighten us, very well and good, but if he can not, we seek solace by saying this seems to be the general belief among the rhinologists and our attention is directed to the remote and obscure pathology in the nose as a great potential factor in causing eye trouble.

When we speak of nasal pathology we are led into a broad field of interpretation and it is very hard, in borderline cases, to tell just where the normal ends and where the abnormal begins; this not only applies clinically, but is true regarding the laboratory findings as well. Climatic conditions have a certain influence, and the various stages of life also play a part, the characteristic anatomy of the nasal chambers, the question of free drainage and good ventilation, the position and shape of the turbinates, all of which have great potentialities in causing sinusitis and other more remote conditions.

While in the United States Army I had the opportunity and pleasure of examining a large number of soldiers, and my attention was particularly attracted to a large number of what I would term abnormal nasal septi, or septi that could cause local or general pathology. I believe that I am not exaggerating when I say that thirty to forty per cent were potential sinusitis cases. I have no figures to substantiate this statement, but I believe it is a conservative estimate. If this statement has any scientific value, then it would be the duty of the ophthalmologists to constantly bear this in mind and be on the lookout for nasal trouble that may account for the eye condition.

Now what are some of the most common eye disturbances attributed to the nasal accessory sinuses? The eye findings are fairly well set forth and they are not unlike those found in a number of other conditions. Some of the most constant findings are as follows: A central or paracentral scotoma, relative or abso-

*Read at the fifty-third annual meeting of the Medical Society of Virginia in Norfolk, October 31—November 3, 1922.

lute; enlargement of the blind spot, the vision not necessarily being disturbed, or slightly so, or there may be blindness. The ophthalmoscopic findings, as reported, may show little or no change in the disk. Some writers have reported finding one to three diopters of swelling of the disk said to be due to infection of the posterior ethmoids, and by subsequent operation on the nose the vision has returned to about normal and the swelling of the disk disappeared with only slight blurring of the edges remaining. I must confess that within my limited experience I have not found a case of eye disturbance that I was satisfied arose from the sinuses. The question may be asked, do I examine the fields in all my eye and nose cases? My answer is in the negative. However, I do make the confrontation and perimetric tests in all cases where I suspect optic nerve involvement. My omission may account for the failure in detecting some of these early and interesting cases, and I hope that by being more careful, and by mapping out all fields, I will be more fortunate in this respect than in the past.

Quoting Dr. Cushing, from an article in the *Journal of American Medical Association*, "When a retrobulbar neuritis is said to be accompanied by two or three diopters of swelling, we are certainly dealing with something which a hyperplasia of the mucous membrane lining the accessory sinuses is not capable of producing.

"During the course of the past twelve months many patients with brain tumor have appeared in the Brigham Hospital clinic who had recently undergone radical intranasal operations for assumed infection of sinuses. Were these operations done merely on the chance that the patient complained of obscure headaches or visual disturbances in the absence of choked disk, it would be understandable; but when these operations are performed on people with full blown changes in the optic nerve and with the idea that cleaning out the ethmoids and sphenoidal regions might check the process, we certainly have gone too far."

I appreciate the delicacy of making a diagnosis of optic nerve disturbance, due to an obscure nasal pathology, and we are not justified in so doing until we have exhausted every means available in making a diagnosis, and in order to reach this final analysis we must have the co-operation of the internist, neurologist

roentgenologist and ophthalmologist and, if we have failed to consult any one of these specialists, we have been derelict in our duty.

The future will be very interesting indeed to us all, especially to the men who have a number of cases on their records of diagnosed eye disturbances due to accessory sinuses, who had refused intranasal operations, as it is only a question of time until the rhinologist will determine whether or not his diagnosis was correct and the proper treatment advised. There have been a number of cases reported to show that the sinuses can and do cause eye trouble, and most of them that have been operated on have shown improvement or gotten well, and at some future time we may be able to tell the subsequent history of the cases who had refused operation.

337 New Monroe Building.

DISCUSSION.

DR. H. L. MYERS, Norfolk: I would like to say a few words on this very important subject. It should be emphasized.

Many conditions of the eye which we used to suppose were due to other causes, are almost certainly proven to be due to diseases of the nasal accessory sinuses. The examination of the anatomy of this region will satisfy anybody as to how easily disease of the walls of the sinuses can affect the optic nerve and other parts of the eye. I think that most of these cases show neuritis.

Dr. Cushing's summing up of the situation is the best to be found on this subject.

DR. J. E. DIEHL, Norfolk (closing): I brought up this subject to start a discussion, and I am sorry that there are not more here to discuss it. There have been volumes of literature written, both pro and con, and right at this time the pendulum seems to be with the pros. Personally, I feel like taking the mid-ground, at least until I have had more experience in this particular condition. It is the tendency of human nature to become over enthused at times, and, as time and experience grow, we often are led to modify, or at times change, our opinion entirely.

Dr. Myers' remarks are very important and instructive and I greatly appreciate his discussion.

HYSTERECTOMY AND OVARECTOMY FOR BENIGN TUMORS AND SUPPURATIVE DISEASE IN SIX HUNDRED WOMEN.*

By G. PAUL LA ROQUE, M. D., F. A. C. S., Richmond, Va.

The six hundred women herewith reported were encountered among fifteen hundred women operated upon for all types of pelvic disease during a period ending 1922. They have all been studied, operated upon and treated by myself personally in various hos-

*Read by title at the fifty-third annual meeting of the Medical Society of Virginia in Norfolk, October 31-November 3, 1922.

pitals, and none have been excluded. There were ten deaths, a mortality of 1.6%: six of these among the first three hundred (2%) and four among the last three hundred (1.3%).

Two hundred and seventy-five (46%) had fibroids of the uterus, variable in size from that of a walnut to 16 pounds, and in number from one to as many as twenty or more. Over 60% of women with fibroids of the uterus also had ovarian cysts and 39% of fibroids were complicated by suppurative disease.

Four hundred and fifty (75%) women had ovarian cysts varying in size from that of an egg to 20 pounds in weight. Approximately 10% of the cysts involved both ovaries. Of women with ovarian cysts 25% had also fibroids and 33 1/3% of cyst cases were complicated by inflammatory disease.

Suppurative disease was present in three hundred and sixty-five (62%) of six hundred women and involved the uterus, both tubes and cyst. In 30% of these, pelvic abscess existed about these organs. Of the cases of suppurative disease in this series, 18% had previously existing fibroids of the uterus and 42% had ovarian cysts.

The pathological findings after the abdomen was opened were those of real pathology,—ovarian cysts and uterine fibroids of sizes, locations and numbers too familiar to need further mention: suppurative pathology seen as suppurating cysts, inflamed fibroids, old-fashioned dyed in the wool pus tubes and pelvic abscesses; these were the pictures exhibited.

More than half of the women in this series presented additional surgical pathology needing operation apart from that which called for the removal of the uterus or ovaries. In eighteen women tubal pregnancy was present; in fourteen the pathology had caused ulceration of the bowel in various parts necessitating bowel suture; more than three hundred had definite appendicitis which of itself needed operation; thirty had gall-stones; fifty hernia; more than a hundred required operation upon the cervix and perineum and rectum; in ten per cent of women there was present serious secondary anaemia, ranging from 21% to 50% hemaglobin; many cases presented heart and kidney disease and obesity, glycosuria and other non-surgical coincidental affections. In six women operation was performed during complicated pregnancy or labor.

Hysterectomy was performed in three hun-

dred and seventy-five women (63%), both tubes being invariably removed with the uterus. Hysterectomy was of the subtotal supravaginal type in three hundred and sixty-five and was complete, including the cervix, in ten cases. Ovaryectomy was performed upon four hundred and ninety (80%) of this series; 11% of the ovarian cases necessitated removal of both ovaries and 89% required the removal of only one. Combined hysterectomy and ovaryectomy was performed in two hundred and sixty-five of the six hundred women (46%). In one hundred and ten of the six hundred cases (20% of the three hundred and seventy-five hysterectomies) only the uterus was removed, the ovaries not being diseased. Of the four hundred and ninety women requiring ovaryectomy, 45% did not need removal of the uterus.

All deaths occurring before complete recovery from the operation and discharge from care regardless of the time and cause of death are charged to the operation. In no case has operation been declined because of desperate condition or for any other reason. One obese woman with large tumor and slight fever died suddenly of embolism two days after admission to the hospital while resting in bed the day before operation was contemplated. No other case died while waiting.

The ten deaths were as follows. Four of these were also reported in a separate contribution dealing with four hundred cases of suppurative disease.

12-1895. 45 years old, large fibroid cystic ovaries and dense adhesions; valvular heart disease. After hysterectomy, removal of both ovaries and appendix, she died the third day of acute dilatation of stomach and heart.

15-2344. 35 years old; fibroids and ovarian cyst. After complete recovery from myomectomy, removal of ovary and appendix, died in five minutes of cardiac embolism while sitting up in bed the twelfth day.

15-2426. 35 years old, pelvic abscess, large ovarian cyst ulcerated into sigmoid, single pus tube; pulmonary tuberculosis. After removal of ovarian cyst and left tube, suture of hole in sigmoid, appendectomy and drainage of pelvic abscess, died six weeks later of septic exhaustion and pulmonary tuberculosis.

16-2502. 35 years old, with large fibroids, ovarian cyst, pus tubes. After hysterectomy, ovaryectomy and appendectomy, died the 15th day of what seemed to be intestinal obstruction.

16-2537. 48 years old with gangrenous ovarian cyst, dense adhesions and bleeding of suspiciously malignant uterus. After hysterectomy, ovaryectomy and repair of sigmoid, died the third day of peritonitis.

16-2556. 25 years old, with double pus tubes, cystic ovary and pelvic abscess all acute and erroneously

believed to be appendicitis or tubal pregnancy. After hysterectomy, ovariectomy, appendectomy and drainage of pelvic abscess, died of septic shock.

21-3838. 30 years old, with three weeks post-abortional, double pus tubes, pelvic abscess and cystic ovary. After three days without fever, double salpingectomy, partial hysterectomy, ovariectomy and appendectomy was performed; she died the fourth day of septic shock and suppression of urine.

21-3841. 40 years old with enormous double intraligamentary dermoid ovarian cyst and small fibroid. After removal of both large ovarian cysts, uterus and appendix, died fifth day of dilatation of heart.

22-3984. Fibroid uterus, ovarian cyst, ruptured extrauterine pregnancy, non-suppurative inflammation. Hysterectomy, removal ovarian cyst, appendectomy, drainage. She died five days later. Autopsy showed pus imperfectly drained.

22-4030. 49 years old with small multiple fibroids, moderate inflammation of uterine and single ovarian cyst. Cauterization of cervix, subtotal hysterectomy and removal of one ovary and appendix was performed. She did well for a week, developed signs of peritonitis and died the tenth day following operation. Many consultations were held and we felt it might be a case of peritonitis from an infected cervix with possible small bowel adhesion.

Of the total deaths there were five in two hundred and thirty-five women in whom the pathology was non-suppurative (clean cases) (2.1%) mostly large tumors; and four of three hundred and sixty-five women with suppurative disease complicating fibroids and cysts (1.6%).

Considering the cases in which only the uterus was removed, leaving the ovaries, there were one hundred and ten women with no deaths; and in two hundred and twenty-five women in whom the ovaries were removed leaving the uterus, there was one death. Cases requiring combined hysterectomy and ovariectomy included two hundred and sixty-five women with eight deaths (3.4%); these were women critically ill with large tumors and suppurative disease needing operations technically difficult.

The women have welcomed operation as a last resort. The clinical story is that of recurrent attacks or alternate remissions and exacerbations of symptoms, periods of encouragement that they may be better, discouragement that for some usually assignable reason they have had a relapse and finally despair of being cured without "the knife." The operation is forced by serious illness from suppurative disease or large sized tumors. Broadly speaking, the larger the tumors, the less extensive the inflammatory disease and *vice versa*.

Those socially and financially "well to do"

have many times been "almost completely cured" by endocrinologists, electro-therapists and courses of "local treatments" by "office gynecologists." Those poor and less conspicuous socially have recited the same story of ups and downs characterized by remissions and exacerbations of symptoms independently of local treatment and endocri-organo-therapy, but in spite of Pink Compounds, Gold Discoveries, Wines of special designation, and home brewed teas and concoctions painstakingly prepared by friends and neighbors.

With the clinical story so familiar, it would seem quite superfluous to urge all women hastily to operation by the threat of impending death from the disease. The real advantages of early operation for obvious and symptom producing benign tumors of the ovaries and uterus are incident to the cure of suffering, checking extension of disease, preventive of the necessity for technically more difficult, more radical and more dangerous surgery on account of complicated pathology in women older and less healthy. The conservative purpose of treating benign tumors and inflammatory disease of the uterus and ovaries is directed by efforts to preserve menstruation, ovulation and the ability of the woman safely to bear children. The less extensive the disease, the more likely are we able to preserve uterine and ovarian tissue and with these menstruation and ovulation. Early operation is conservative surgery; late operation calls for radical surgery. And though it is clearly demonstrated that the longer they wait the more organs will have to be removed and though even for ancient and extensive disease the operation is not likely to be fatal, the disease may terminate fatally in spite of the operation in a few cases.

The urgency of immediate operation is an important question. Women rarely receive operation for the first "spell" of symptoms caused by pelvic tumor and inflammation save as a result of an erroneous diagnosis of appendicitis, the operation for which discloses a normal or diseased appendix and discovers disease of the pelvic organs. Uniformly good results following delayed operation upon previously unrecognized twisted ovarian tumors, ruptured tubal pregnancies, and appendicitis, under the erroneous belief that we were dealing with pelvic infection or fibroids; and hasty operation upon previously unrecognized pus tubes or pelvic abscess under the erroneous

belief that we were dealing with ovarian cysts or uterine fibroids; the results of such errors without gross differences in the results suggest that after a reasonable wait for sizing up the situation the time for operation is of minor importance as compared to the method of procedure and technic of operation.

There can certainly be no reason, if we permit experience to speak for itself, for "emergency" operations for tumors and inflammatory disease of the pelvic organs. On the other hand, there is the conspicuous observation that no case need wait long. In the cases here reported, errors have occurred in both directions; on the one hand waiting patiently for symptoms to subside and on the other proceeding expeditiously to do the job. There have been no conspicuous differences in the results of both plans of action. Broadly speaking it seems wise to get the patient and pathology ready then go ahead but never rush. Any case may without danger wait until they can be properly placed under the care of a skilled surgeon; many cases may quite properly be operated upon the day after admission; no case should be "emerged" upon.

A systematic thorough operative procedure is called for. In nearly all cases after the woman is anaesthetized the final examination is made. After cleansing the vagina of gross filth, the iodized cervix is well dilated and a dull spoon curette introduced for exploratory purposes and to remove loose material. In years gone by, we usually scraped about in the interior of the uterus. We have never felt any reason to believe that curettage does good. If the cervix is torn and hysterectomy is not necessary, we have repaired the cervix if it is not much reddened or infected; if badly infected or if hysterectomy is to follow, we prefer to amputate the cervix with the electric cauterizing knife. This practice was not pursued in the earlier cases and some of the women were annoyed by purulent vaginal discharge after operation. Since we have had satisfactory electric cauterizing knives, we have employed this method of destroying the cervix and the women have had after hysterectomy a dry vagina. We feel quite strongly that infected torn cervixes should not be neglected because "the abdominal work may be enough." Such lesions need treatment because of their own troubles regardless of abdominal disease.

After dealing with the cervix, lesions about

the vagina, vulva and rectum are scrutinized and dealt with accordingly.

The abdomen is usually opened by a vertical incision to one side of the middle line. In exceptional cases of excessively fat or greatly overstretched and prolapsed belly walls or of large fixed intraligamentary tumors, an elliptical cross cut of the abdominal wall has seemed to give more easy access to the pelvic pathology and left a good abdominal wall.

Before the pelvic organs are touched or closely inspected, the gall-bladder, bile duct and stomach are examined; usually both kidneys are felt to see if one may be absent and to detect lobulated kidney and palpable calculi. Inguinal and femoral hernia are removed by the intraabdominal method and umbilical herniae are excised by prolongation upward of the vertical incision. The appendix is then removed and we are ready to go to work. In approximately twenty-five or thirty of the cases here reported, appendectomy had been performed by other surgeons before coming to me for pelvic disease. I have also operated upon many women for appendicitis after they had previously had pelvic disease operated upon by other surgeons. Three or four of the women in this series of six hundred seemed too sick to take the extra three minutes for normal appendectomy.

By proceeding in this manner curing the non-pelvic lesions before approaching the pelvic pathology, the woman is cured of all her disease thereby being given more nearly 100% efficiency of operation; second operations for appendicitis, hernia, lacerated cervix and perineal tears are forestalled; the operative procedure most apt to be productive of shock is reserved for the last so that she may be put without delay in a warm bed upon the treatment for shock. In dealing with gall stones, however, we have in thirty cases of this series operated upon the gall-bladder as the last act of the operation in cases of pelvic pathology of non-suppurative character. In the presence of pus in the pelvis we have usually deferred the gall-bladder work for a subsequent operation.

We have performed three types of ovariectomy and hysterectomy; partial, subtotal and total. Cyst puncture has long been abandoned. To clip from the uterus an innocent pedunculated fibroid is not designated as an operative procedure.

Partial or subtotal ovariectomy is employed for non-strangulated, single or multiple cysts with a respectable amount of normal ovarian tissue about the hilum and with little or no evidence of cyst infection. In such cases the remaining portion of the ovary is stitched with its sutured raw surface under the round ligament.

Total ovariectomy has been employed for the removal of ovaries and cysts hopelessly buried in inflammatory exudate or dense adhesions or obviously internally infected; in all cases showing at operation evidence of recent strangulation or gangrene resulting from torsion of the pedicle and for cysts in old women.

In four cases in which ovarian tissue was conserved in young women, we have had to re-operate after from one to three years on account of ovarian cyst, two of whom had tubal pregnancy and one suppurative salpingitis. Perhaps we have erred on the side of conservatism in other cases, but the great majority of women in whom ovarian tissue was thus conserved have remained satisfactorily cured and been most grateful that they continued to menstruate.

My standard reason for removal of ovaries is complete destruction of ovarian tissue either by suppurative inflammation or large cyst formation. Malignant disease, primary in the ovaries, calls of course for removal if recognized early; but I have not thus far been able to do this. Inflammatory disease primary in the ovary is exceedingly uncommon. In perhaps six cases of this series I have encountered small abscesses in ovaries in women with normal tubes. Practically all the ovarian abscesses I have seen have been ovarian cysts infected from adherent suppurating tubes, the appendix, caecum, sigmoid and small bowel. In fourteen cases we have been compelled to suture openings into the bowel at points of dense adhesions and in one case the bowel had been previously punctured by a gynecologist while puncturing an abscess in the cul-de-sac. All but one of these recovered though some had close calls. All cases of ovarian cysts to which the bowel had not ulcerated have recovered.

The fluid from the largest cyst of this series weighed twenty-one pounds. The large ovarian cysts are commonly not complicated by inflammation; if they were the women would

be so sick they would be compelled to be operated upon before the cyst becomes so large.

Over 90% of all patients in this series requiring operation upon the ovaries also required operation for other lesions of the pelvic organs; 60% required operation for displaced uterus; 30% required removal of tubes; 25% repair of lacerated cervix; 25% hysterectomy or myomectomy for fibroids. On the other hand 30% of women in whom we have corrected displaced uterus have needed also removal of cysts and over 60% of sufferers from fibroids of the uterus have also had ovarian cyst of operative size. The number of cases of ovarian cysts in women with uterine displacement or fibroids has so definitely increased with the age of the women that we are quite suspicious that in some way displacement favors the development of ovarian cysts. Certainly in such cases (a large proportion) a vaginal pessary, even though it may seem to hold the uterus forward, cannot cure the woman. For cysts existing in women with fibroids, advocates of light therapy by radium and X-ray have not yet offered claims of cure by these methods.

In no case have both ovaries been removed from any woman under forty-five years of age unless all ovarian tissue had been hopelessly destroyed by inflammatory disease and cysts. In all but 10% of the total cases I have found it practicable to save some portion of at least one ovary and avoid the production of artificial menopause. This practice has thus far been satisfactory and while a few women have failed to get perfect relief of symptoms and a small number have had second operations after a year or so, the number has been so small and the satisfaction to the women has been so great, I am satisfied to continue the purpose of sane conservation of ovarian tissue in young women. In women beyond the age of forty-five no attempt to conserve ovaries was made, unless they were unquestionably normal. I have not removed ovaries on account of pain. Women with pathology in the ovary who suffer pain have also uterine or tubal inflammation or painful tubal and uterine contraction incident to torsion of cysts or prolapsed ovaries. In my experience women with the largest ovarian cysts (five to twenty pounds) have not complained of pelvic pain and have shown at operation normal tubes and uterus free from inflammation. This observation and the dis-

covery of cystic ovaries incidentally during operations upon other abdominal organs which have no symptoms of pelvic disease has aroused in me a strong suspicion that ovarian cyst, unless complicated by inflammation of a tube or uterus or of the cyst itself, is a painless disease save only when twisted on its pedicle. We cannot concede to the wisdom of removing ovaries merely because hysterectomy is necessary. On the other hand it has seemed wise in a considerable number of cases in which double ovariectomy for cystic and suppurative ovarian disease and double pus tubes is called for, to remove the enlarged prolapsed or suppurative uterus.

We have employed two types of partial hysterectomies. Both suppurating tubes and the intervening portion of the fundus uteri removed in one piece makes easy the complete covering of all raw surfaces by a continuous stitch from one end to the other of the broad ligament over the uterus. The other type of partial hysterectomy or myomectomy consists of the deliberate excision of single, medium or small sized intra-mural fibroids, and a small amount of the adjacent wall of the uterus. After thus removing by means of a surgical incision fibroids of medium size, reconstruction by suture of the uterine incision seems superior to the less exact method of digging out fibroids, leaving a ragged bed which can rarely be neatly closed.

Subtotal hysterectomy removes all of the uterus above the level of the bladder attachment. This is the type of hysterectomy called for in the great majority of women with multiple fibroids, extensive suppurative disease, and in women at or beyond the menopause with enlarged sagging or prolapsed uterus from whom it is necessary to remove both tubes and suspend by suture the cervix, bladder, vagina and rectum high in the pelvis for the relief of prolapse. Preceding hysterectomy in women with large cystic, torn and infected cervixes, cautery amputation of the cervix has proved of great utility in destroying the diseased cervix without the necessity for the more tedious and perhaps slightly more dangerous total hysterectomy from above. The small remaining piece of thoroughly cooked cervix, after cautery amputation of the cervix from below and subtotal hysterectomy from above, serves nicely as holding material to which after being pulled as high as possible,

the round and broad ligaments may be sutured for suspension of the vagina. This combination of cautery amputation of the cervix and subtotal hysterectomy has so far, in approximately one hundred cases, served quite satisfactorily for the cases to which total hysterectomy is advocated by many. Menstruation is not stopped by this method. I have performed the complete hysterectomy from above in a few cases of this series without fatalities but much prefer the procedure as outlined above. I am aware that the practice of total as compared to subtotal hysterectomy is becoming increasingly popular and am open to conviction that the total operation from above is no more dangerous and more completely curative than subtotal hysterectomy preceded by cautery amputation of the cervix.

All abdominal hysterectomies have included removal of both tubes. I have seen a sufficient number of women re-operated upon for diseased tubes allowed to remain after hysterectomy to convince me of the wisdom of removing both tubes with every hysterectomy. Except in women beyond the menopause, I have succeeded in being able to leave one or a portion of one sound ovary in approximately 90% of cases of hysterectomy.

Twenty-five cases of myomectomy or partial hysterectomy are recorded, a small number (less than 10%) of the fibroid cases. Most of the fibromyomata upon which I have operated have been so large and so numerous as to leave little or no normal uterus above the cervix. There are cases in which myomectomy is definitely indicated but we must choose these with judgment if we would get the patients well.

Observation of the great frequency of ovarian and inflammatory disease in women with fibroids would seem to place great limitations upon the usefulness of the X-ray and radium to women with fibroid disease. There are few women to whom radiation is applicable, fewer to whom X-ray and radium applications can be assured of curative results and many to whom it is dangerous. The known effects of radium as an agent capable of producing "radium sickness," shock and definite immediate mortality; a burned, fibrous uterus (an "undesirable tenant"); occasional urinary and rectal fistulae (disagreeable sequelae), leads one to believe that the treatment of the few uncomplicated fibroids of moderate size in women beyond forty years of age, by dilata-

tion, curettage and application of radium is attended by higher mortality and fewer cures than the surgical operation.

Hysterectomy and ovariectomy for fibroid, cysts and suppurative disease of all grades of severity in all the women affected should yield complete cures in 98.5 per cent and a mortality of less than 2 per cent of women affected.

THE SEHRT AORTA CLAMP FOR THE CONTROL OF POSTPARTUM HEMORRHAGE.*

By M. PIERCE RUCKER, M. D., Richmond, Va.

Truesdale tells of finding in the German advanced dressing-stations, metal tourniquets of several sizes. The Germans evidently made wide use of this principle for the control of bleeding. It now appears that Sehrt was the originator of the instrument, and that he was driven to the invention of this substitute for the Esmarch tourniquet both on account of the lack of rubber and the fewness of assistants in the field hospitals.

In 1908, Momburg introduced his adaptation of the Esmarch bandage for the control of bleeding in the lower half of the body. The Momburg belt was quickly adopted by obstetricians as a help in the graver cases of postpartum hemorrhage. Sigwart, Hoehne, v. Reding, Fromme, Schestopal, Gogoberidze, Weber, van Erps, and others reported favorable results, Sigwart going so far as to recommend that midwives equip themselves with the necessary rubber tubing. On the other hand, according to Fleischer, Rielander noted circulatory disturbances and collapse after its use, and Riemann and Pagenstecher other untoward effects. Döderlein was able to collect from the literature seven deaths due to its use.

When the World War broke out, Gauss was engaged on the problem of compressing the abdominal aorta without exerting pressure upon other abdominal structures, and devised an apparatus for that purpose. In the meantime, Sehrt had extended the principle of his metal tourniquet to the abdominal aorta and developed an instrument that Gauss himself says is better than his, in that it is lighter and can be applied more quickly. In the last two years, there has been a great deal of favorable comment in the German magazines on the use of the metal clamp for compressing the abdomi-

nal aorta. In most cases, when the clamp is properly applied across the body just above the navel so as to occlude the aorta, either partially or totally, the hemorrhage promptly ceases. Gamper, however, reports three cases in which the compression stopped the pulsation in the aorta below the clamp, but not the bleeding from the uterus. He thinks that this was due to a collateral circulation through the ovarian arteries. Becker also reports some failures, but was able to reduce their number by fitting a special pad to the compression plate of the Sehrt instrument. Several patients upon whom the clamp was used have come to autopsy from one cause or another, and in none of them has there been any evidence of damage by the clamp.

There is nothing in the American literature about the clamp except a few abstracts of the German articles. Recent articles upon postpartum hemorrhage by Hornstein and Titus make no mention of the mechanical compression of the aorta for the control of the bleeding. The instrument that I show you tonight had to be imported, and from the difficulty I had in getting it, I would judge that there are few of them in this country.

I have used the instrument in ten cases. The technique is very simple. One locates the pulsating aorta between the recti just above the navel and applies the compression plate over it and compresses the aorta against the backbone until the hemorrhage ceases. The clamp can be left in place for twenty or twenty-five minutes. My patients have complained less of it than of vigorous massage of the uterus. Most of the cases were of only moderate severity, and the bleeding could probably have been controlled by massage of the uterus.

In one case, a difficult forceps delivery, bleeding began immediately after the delivery of the child. Both the mother and child needed my attention at the same time. I stopped the bleeding with the clamp, resuscitated the baby, expressed the placenta, changed gloves, repaired the cervix, and removed the clamp.

In another case, that of a large woman with a big fibroid, the bleeding started two hours after the delivery of the afterbirth. The interne controlled the bleeding partially with the clamp until he could get ready to pack the uterus, and completely stop the bleeding. One other patient was so large that I was un-

*Read before the Richmond Academy of Medicine and Surgery, January 9, 1923.

able to apply the clamp. Her hemorrhage was controlled by a vaginal pack.

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1600 Park Avenue.

CERTAIN PHASES OF ARTERIAL HYPERTENSION.*

By W. W. HERRICK, M. D. New York, N. Y.

As has been well said, rise in blood pressure, either systolic or diastolic, is not a disease: it is a mere symptom. Like other symptoms its causes are multiple: they are also obscure. As in treating of other pathologic states, the etiology of which is unknown, one must fall back upon description of the associated conditions. With respect to hypertension, the more definite of these conditions are:

1. **RENAL INSUFFICIENCY:** In the majority of instances of nephritis with demonstrable incompetency of the excretory function of the kidney, there is a rise in both systolic and diastolic pressures. When accompanied by persistent increase in Urea N₂ and of Creatinin in the circulating blood, hypertension is usually serious and serious in rough proportion to the extent of the rise in pressure above the normal. Few of these patients who show both hypertension and persistent N₂ retention live more than two years. Occasionally, one sees cases with great retention of nitrogenous products from kidney impairment without concomitant hypertension. Such cases, in my experience, are usually either in the terminal phases of their malady and show evidences in the cardiovascular system of past hypertension, or are the victims of active, and often, terminal infection. It is well to remark, that so firmly fixed in the minds of the profession is the idea that hypertension signifies nephritis, that even yet, despite the mass of evidence to the contrary, it is difficult for many to realize that this is by no means true. To brand every case of hypertension as nephritic is almost as if one branded every instance of chronic fever tuberculous.

2. **TOXEMIAS OF PREGNANCY:** Hypertension, both systolic and diastolic, characterizes most cases of this baffling condition. The rise

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in blood pressure almost always precedes, by days or weeks, any albuminuria, casts, or any retention of urea, uric acid or creatinin in the blood. In fact, hypertension may be the sole evidence of the trouble. This usually declines promptly upon delivery, except when it has previously existed or when it has arisen on a basis of that vascular instability that so often presages hypertension. The kidney involvement, as shown by every known test of renal function, is secondary and usually late. No better instance of the extra renal origin of many cases of hyperpiesia is to be found. No other type of hypertension offers such attractive possibility of contribution toward the solution of the general problem, for no other is so definitely associated with a self limited state that can be controlled and observed in all its phases.

3. **ARTERIOSCLEROSIS:** Arteriosclerosis is more often a sequel than a cause of hypertension and may exist without any rise in blood pressure whatsoever. The association of sclerosis of the larger arteries with cardiac hypertrophy and a high pulse pressure is not infrequent. Cases of this type exhibit high systolic with normal or low diastolic pressures. The stroke volume output of the ventricle appears large. The smaller arteries seem less altered than the large trunks. A plausible explanation of the blood pressure findings is a large stroke volume output on the part of the ventricle into a relatively rigid arterial tree. Such cases are seen most commonly in those well past middle life and are comparatively benign. The high systolic pressure, characteristic of aortic insufficiency, is dependent upon the large stroke volume output of the ventricle, while the low diastolic pressure is largely, if not wholly, due to the relaxation of the peripheral vessels.

4. **THYROID DISTURBANCES:** Many cases of the so-called essential hypertension exhibit signs of excessive activity of the thyroid. Not only is the gland enlarged and its blood supply obviously increased, but tachycardia, increased metabolic rate and pressure of activity may be detected. In frank cases of thyroid toxicosis, the blood pressure is frequently above normal, rarely, however, ranging above 180 systolic.

5. **ESSENTIAL HYPERTENSION:** The importance of differentiating hyperpiesia from nephritis, though stressed by many writers, has

not had sufficient general recognition. It is to this group I would direct detailed attention. In essential hypertension there is entire absence of evidence of renal incompetency, inflammation or degeneration. A certain number, as years go by, develop an arteriosclerotic type of kidney with gradual impairment of function, but by far the larger part find their end stage in cerebral hemorrhage or myocardial insufficiency. Although occasionally found in those who are thin, the average person with essential hypertension is over-weight and inclined also to plethora. Many, in fact, exhibit the *polycythemia hypertonica* with increased hemoglobin, increased number of erythrocytes in the circulating blood, increased ratio of solids and increased blood viscosity. The activity, energy and capacity of these cases has been a matter of remark on the part of many observers. They have been classified with some reason as hyperthyroid cases. Not infrequently they show a heightened basal metabolic rate. In the earliest phases of the malady the blood pressure may be within normal limits excepting an exaggerated response to effort. One can frequently predict the eventual development of hypertension by observing an undue rise in systolic pressure after effort, interest or excitement. The diastolic pressure rises with the systolic and, when the latter exceeds 200 mm., the former tends to be about 100 mm. lower. As Mosenthal¹ has pointed out, rare examples of this condition have a diastolic pressure raised out of proportion to the systolic. In all of these vasoconstrictor phenomena, which supposedly form the background of high diastolic pressures, are prominent.

Arteriosclerosis is a late, but, I believe, almost constant development. It seems to involve primarily the small arteries rather than the large trunks. It can, of course, be best detected by careful ophthalmoscopic examination. Sclerosis of the cerebral, coronary and renal arteries and perhaps we may add those of the pancreas, is the common basis of the slowly evolving symptoms. The process may last for years without hampering the victim, but sooner or later the blow falls. It is of interest that persons of this type are peculiarly resistant to infections.

Laboratory studies in these cases may reveal information of considerable interest and value. Except in the later stages, when extensive

1. Mosenthal, H. O.; Med. Clin. No. Amer., 1139; Jan. 1922.

arteriosclerotic changes have taken place in the kidney, or when myocardial weakness has led to passive congestion, there is no albuminuria and very rarely casts. The phenolsulphonephthalein test shows a normal output of this dye. The ability of the kidney to pass a concentrated urine is not impaired. Chemical examination of the blood reveals normal figures for creatinin and urea, N_2 . A certain proportion of these individuals have a concentration of uric acid in the blood somewhat above the normal level, ranging from 3.5 to 7. mg. per cent. A considerable number have hyperglycemia—the blood sugar after a twelve hour fast being from .120 to .21 per cent. Many have a renal threshold for glucose above the average normal point at .17 per cent. In consequence, glycosuria is not always a reliable criterion of the state of the carbohydrate metabolism. As chemical studies multiply, I am persuaded that the essential hypertonias will be subdivided into different types. When such subdivision is brought about, I believe an important class will be those showing hyperglycemia. There are certain distinctive characteristics exhibited by this type. Elsewhere they have been classified as prediabetic. With the increase in blood pressure and the heightened concentration of glucose in the blood, one finds as associated features, overweight, plethora and arteriosclerosis. The interrelationships of this complex of symptoms are not without practical significance.

Attention has been called to a reduced tolerance for glucose in many cases with hypertension by O'Hare,² Botti,³ Albertoni⁴ and others.

Its cause is an interesting matter of speculation. Neubauer⁵ in 1910 suggested that an increase in epinephrin might be the basis of this disturbance. Owing to the absence of any test for the quantitative determination of epinephrin in the circulating blood, this attractive theory remains unproved. The idea of Pierce and Keith⁶ that hyperglycemia results because the damaged kidney does not utilize the normal amount of sugar presented to it, would claim more attention in the type of case under consideration, if hyperglycemia did not so often occur in cases without evidence of damage to the kidney. The work of Myers and Killian⁷ upon the diastatic activity of the blood may have bearing on the hyperglycemia

of hypertension. These observers found that many "nephritics" have an abnormally high diastatic activity of the blood which they assigned to a probable renal insufficiency. Diastase mobilizes glucose from the glycogen of liver and muscle and, when increased, brings about hyperglycemia. The question as to what constitutes a "nephritic" must first be made clear. O'Hare⁸ makes the interesting suggestion that the hyperglycemia of hypertension results from lessened functional efficiency of the pancreas through sclerosis of the pancreatic arteries. The latter theory is extremely plausible in view of the arteriosclerosis that is so inevitable in the later stages of the malady. In my opinion, a still more simple cause of the hyperglycemia of hypertension can be brought forward as applicable to at least some cases. Is it not possible that some are the result of an ill balanced diet with excess of carbohydrate? It has been a routine practice of many to restrict or prohibit protein in all cases showing high blood pressure without regard to the state of the kidneys. The excuse for this practice has been that traditionally hypertension has carried with it the idea of nephritis. Since the amount of fat one can take comfortably is limited, withdrawal of protein leads directly to increase in carbohydrate. An ill balanced ration with excessive carbohydrate brings in its train a certain tendency to overstrain of the pancreas and to obesity and a debatable tendency to flabbiness of tissue and to arteriosclerosis with circulatory insufficiency.

Is there any proof of an association of arteriosclerosis and hyperglycemia? I know of no experimental proof but on clinical grounds there is strong argument favoring such a view. In diabetes mellitus, even in the young, arteriosclerosis is almost a constant finding. There is no reason, at least in juvenile diabetes, to believe that the arteriosclerosis precedes the diabetes; rather does it appear to be a result of the prolonged metabolic disturbance of which hyperglycemia is the most obvious evidence. My own study of a group of hypertonias of middle age with hyperglycemia has led to an opinion that they all exhibit more arteriosclerosis than their years and their hypertension would seem to demand,

5. Neubauer, E.; *Biochem. Ztschr.*, Berl. 1910; XXV, 284.

2. O'Hare, J. P.; *Am. Jour. Med. Sci.*; CLX, 366, Phil. 1920.

3. Botti, A.; *Policlinico (sez. pret.) Abst. Jour. Amer. Med. Assoc.*; 29:249-250; Feb. 20, 1922.

4. Albertoni. Cited by Botti; ditto.

6. Pierce, G.; Keith, N. M.; *Proc. Soc. Exper. Biol. & Med.*, XII:210, N. Y. 1915.

7. Myers, V. C.; Killian, J. A.; *Biol. Chem.*, XXIX:179; Balt. 1917.

8. O'Hare, Loc. Cit.

There is another avenue of inquiry. In cases in which hyperglycemia has been present, what is the effect upon arteriosclerosis of reducing the blood sugar to a normal level and keeping it there? In cases of diabetes mellitus we know that the effect of the maintenance of the blood sugar at a normal level upon the arteriosclerotic complications, such as gangrene and retinitis, is generally a happy one. My own study of a number of examples of hypertension with hyperglycemia has led to the finding that in a very considerable number,—not in all—the restoration of the blood sugar to an average normal level is accompanied by an appreciable fall in blood pressure and lessening of the symptoms of circulatory strain. In such a result, to be sure, the abolition of hyperglycemia is not the sole factor. Almost without exception these patients are overweight: diet that reduces glycemia reduces weight, and reduction in weight, as Rose⁹ and others have shown, frequently reduces blood pressure. With such loss in weight, there are doubtless other factors, such as lessened volume of circulating fluid and decreased metabolism. The factors of rest, of release from business or domestic cares, which make data on blood pressure under institutional conditions so unreliable, do not obtain in these cases, since results were had in ambulatory patients going about their ordinary concerns. The literature dealing with the blood pressure of diabetes mellitus has been studied by Rosenbloom¹⁰ who adds observations on 140 cases. From this material one can conclude that there is no change in blood pressure in the average case, but that in milder forms in stout elderly people, especially with evidence of chronic nephritis, or of arteriosclerosis, there is frequently hypertension.

It is certain that cases of severe diabetes mellitus, particularly in the young, are most prone to exhibit a low blood pressure. In the diabetes of late life, however, hypertension is very common and with it obesity and arteriosclerosis with their consequences. As Mosenthal¹¹ has suggested there are different types of diabetes. The diabetes of early life seems based upon profound functional disturbance or the results of infection; that of later life, upon the consequence of degenerative changes in structure, perhaps in the main, arteriosclerotic. This complex of hyperglycemia, obesity,

hypertension and arteriosclerosis is one of the most important of later life, for in it lie seeds of early decay. The early discovery of tendencies toward this complex is within the capacity of any clinician with adequate laboratory equipment and means much to the intelligent patient willing to co-operate in attempting to ward off the consequences of neglect or of ill advised treatment.

TREATMENT: In the management of essential hypertension much can be accomplished by education of the patient. Not infrequently, therapy is a problem in psychology. It is characteristic of patients with this malady to carry on under pressure. They work hard, and, if they play at all, play hard. They are those who get things done. Much of their energy is wasted in the mobilization of all their forces for trifles. One who always works "on his nerve" is laying the foundation of chronic vascular spasm that means eventual established hypertension. For such the explanation of this danger, the change in attitude toward the daily tasks, the cultivation of an equal mind, the avoidance of unnecessary expenditure of nervous and physical energy; these are all important.

REST: The influence of rest upon high blood pressure is well known and has been chiefly studied by Mosenthal.¹² Within a few minutes of relaxation, both systolic and diastolic pressures begin to fall; the drop in systolic pressure being much greater than that in the diastolic. If the rest is prolonged for several days, a still greater fall in pressure is had, but always the decline in diastolic pressure lags behind that of the systolic. Exceptional cases are little influenced. After resuming activity, the blood pressure tends to regain its former level but often some time elapses before this occurs. A period of rest and relaxation in the middle of each day is favorable. The growing habit of afternoon tea has much to recommend it. In cases exhibiting signs of cardiovascular strain—imminent or declared—the enforcement of a rest day once a week is of the greatest benefit. This may be spent in bed, or if the latter is irksome, in the quiet of a library or other environment, from which the ordinary irritations are excluded.

EXERCISE: Exercise, if well within the limits of circulatory capacity, lowers blood pressure. Strenuous forms of competition, such as tennis,

9. Rose, R. H.; N. Y. M. J.; 1922. CVX: 752.

10. Rosenbloom, J.; Journ. Lab. & Clin. Med., St. Louis, April 1922. VII; 7, 392.

11. Mosenthal, H. O.; Med. Clin. No. Amer., 1922.

12. Mosenthal, H. O.; Med. Clinics No. Amer., May 1922. V. 6. 1139.

TABLES SHOWING RELATION OF BLOOD PRESSURE TO WEIGHT AND GLYCEMIA.

	Weight	B. P.		Glucose, %	Urea N ₂ , Mg. per 100cc.	Uric Acid, Mg. per 100cc.	Creatinin, Mg. per 100cc.	Chlorides, Grams per liter.	Symptoms.
		Systolic	Diastolic						
Man, 62.									
Sept. 30, 1921	174	170	95	.140	16.66	3.26			Cardiac symptoms.
Oct. 14, 1921	171	160	100	.150					
Nov. 11, 1921	166	160	95	.148					
Dec. 1, 1921	158	120	80	.140	17.5	6.75	2.00	4.78	No cardiac symptoms
Jan. 10, 1922	158	130	90	.140	19.00	4.43	1.50		
Mar. 7, 1922	158	135	90	.117	20.00	3.75			
May 6, 1922	156	140	100	.117	20.00	3.5	1.20	4.78	
Sept. 1, 1922	158	145	90	.125	11.60	5.00	1.11	5.44	No cardiac symptoms
Man, 52.									
Mar. 25, 1920	215	146	88	.163					Obesity, furuncles.
April 14, 1920	208			.101					
May 15, 1920	205			.094					
Oct. 20, 1920	195	112	72	.125					
Feb. 17, 1921	191	114	62	.129					
Jan. 3, 1922	196	132	77	.111					
Jan. 23, 1923	189	122	76						
	Weight	B. P.		Glucose, %	Urea N ₂ , Mg. per 100cc.	Uric Acid, Mg. per 100cc.	Creatinin, Mg. per 100cc.	Chlorides, Grams per liter.	Symptoms.
		Systolic	Diastolic						
Man, 57.									
July 7, 1920	216 $\frac{1}{4}$	190	100	.188	12.41	5.77	1.76	7.97	62.7 Palpitation, Pericordial distress.
October 12, 1920	205	160	90	.098	13.39	3.55	2.14	5.23	No cardiac symptoms.
Mar. 10, 1921	208	154	90	.114				4.97	Laxness in diet.
July 6, 1921	215	160	90	.133	13.8	4.16	1.61	4.95	
Woman, 64.									
July 28, 1920	166 $\frac{1}{4}$	190	100	.246	19.55	3.56		66.6	Dyspnoea, edema.
		210	110						
Oct. 15, 1920	160	150	90	.104		2.7			No cardiac symptoms.
Jan. 15, 1921	160	165	90	.095					Laxness in diet.
Woman, 50.									
Dec. 6, 1920	165	160	95						Cardiac symptoms
Feb. 5, 1921	165	170	90	.200	11.14	2.38	1.20	4.47	
Mar. 11, 1921	153	160	95						
Apr. 11, 1921	154	140	70	.117					No cardiac symptoms.
Woman, 56.									
Nov. 22, 1922	164	170	90	.166	15.				Dyspnoea,
Jan. 3, 1923	153 $\frac{1}{2}$	160	90	.143					Systolic at Apex.
Jan. 16, 1923	152	140	70	.133					Systolic persists.

are to be avoided, but golf is ideal. Walking and riding are also of benefit. The effect of mild exercise, after a possible primary slight rise of blood pressure, is vaso-dilatation and a general fall which lasts for some time. The advice that the patient may safely exercise well

within the limits of dyspnoea or of fatigue can be given without hesitation.

Drugs: These are of minor importance. To aid in release from excessive nervous tension, chloral is useful and may be given over long periods without fear of impairment of myo-

cardial efficiency. Occasionally a case will seem to do well with small doses of the iodides, 5 to 10 grains daily. The nitrites are of little use except in the emergencies of the later stages of the disease. A drop of *spiritus glycerini* on the tongue at bedtime may hasten the vasomotor relaxation induced by rest.

Diet: Diet may be all important. The physician should be wary of prescribing an abnormal or ill balanced diet unless there is ample reason. Most adults, as most children, do best on a balanced ration. If chemical examination of the blood shows no retention of the products of nitrogenous katabolism, no excess of glucose or of chlorides, and, if survey of renal function exhibits no defects in the capacity of the kidney to excrete nitrogen or salts or glucose, there is no reason for depriving an individual of any important class of food material. Means are at command for adequate chemical control of diet and these should be used. If, under properly controlled conditions, there is excess of nitrogenous crystalloids, or of chlorides, or glucose, the indications are clear.

The question of weight in relation to cardiovascular, renal or pancreatic strain, needs little elaboration. Experienced actuaries are most hesitant in taking risks in those above weight. It has been well said that one should gain weight up to the age of 30; between 30 and 40, he may either gain or lose a little; but that, after 40 he should begin to lose; and, by 55, if he is to live long, should be real thin.

Such a life schedule of weight keeps pace with the average condition of heart, vessels, kidneys and pancreas. These vital organs undoubtedly reach their highest efficiency between 20 and 30. They probably maintain this efficiency but little impaired until 40. After 40 there is a decline, which after 50 may be quite steep. The wise man will adjust his bulk of body to the declining efficiency of the vital organs rather than heap up added burdens. In failure to heed such a simple law, many sow the seeds of arteriosclerosis, of myocardial failure, of diabetes, of hypertension.

The medicine of the future is preventive; curative medicine in most organic diseases is a failure. By the periodic survey, which any well trained practitioner with use of a few modern laboratory methods is competent to make, pathologic tendencies can be detected in their incipiency and often controlled. Such surveys are not the prerogative of any com-

mercialized institution, but should be a part of the routine care of intelligent individuals by the family practitioner or by some one selected by him. Responsible and authoritative opinions are not to be had from any other source. In the symptom quartet, hypertension, obesity, diminished tolerance for carbohydrate, and arteriosclerosis, lurk many of the dangers of middle life; the consequence of which can be postponed or abolished by scientific care.

SUMMARY: 1. Rise in either systolic or diastolic blood pressure is a symptom of varied, though unknown etiology.

2. The clinical conditions with which high blood pressure may be associated are: certain types of nephritis, some forms of arteriosclerosis, certain toxemias of pregnancy, examples of hyperthyroidism, of aortic insufficiency and of increased intracranial pressure.

3. A larger group exists independently of other conditions heretofore described. These are classified as the essential hypertonias. As clinical study develops, this group will doubtless be subdivided. Such an attempt is made in the present study.

4. A group characterized by the symptom quartet: hypertension, hyperglycemia, obesity and arteriosclerosis is considered in detail. The relation of these symptoms to faulty diet, particularly to an excessive ration of carbohydrate, seems clear in the cases cited. The importance of reducing the weight of the overweight hypotonias should be stressed.

5. Periodic health surveys should be part of the routine care of individuals by the practitioner. Such surveys are not the prerogative of any commercialized institution.

49 East 53rd Street.

TRANSFUSION OF BLOOD.*

By CARRINGTON WILLIAMS, M. D., Richmond, Va.
Associate in Surgery, Medical College of Virginia.

The transfer of blood from one individual to another has been recognized since the earliest days of medicine as a valuable therapeutic procedure, and attempts to accomplish it have been made since the middle ages. In modern surgery the greatest improvement in technic was made by Crile when he introduced his cannulas for direct anastomosis of an artery of the donor to the vein of the recipient.

*From the Department of Surgery, Medical College of Virginia.

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This method, or some modification of it, remained in quite general use until about ten years ago, when it was demonstrated that the transfer could be made safely by collecting the blood in a suitable receptacle and introducing it into the recipient before clotting occurred. At about the same time, it was found that anti-coagulants could be added to the blood as it was collected, and the transfer made in a more leisurely manner. There has been during this time a vast amount of literature on the subject, written by advocates of many methods, among them Kimpton and Brown, Lindeman, Satterlee and Hooker, Lewisohn, Unger, and others too numerous to mention. These authors described methods which at once established transfusion as a practical and popular procedure. Moss added tremendously to the safety of the procedure by applying blood grouping as a necessary test before the transfusion.

The conception of the blood as an organ of the body should put transfusion of blood in the group of surgical procedures for organ transplantation. Fortunately, we are transplanting a part of an organ easily obtained, easily introduced into the recipient, and easily nourished. This conception of transfusion would seem to give a sounder basis for study of the procedure, and a safer attitude for the practitioner, for it is not devoid of danger, than would classing it with the many modern intravenous medications.

If, therefore, we class transfusion of blood with the transfer of tissue, we must recognize the unsatisfactory state of transplantation surgery, and recognize transfusion as one of its few satisfactory examples. For transplantation of tissue, the patient himself is usually the donor. We have all seen the unsatisfactory results of skin grafting with homografts even after matching the blood group of the recipient, yet autografts are almost always successful. In transfusion of blood, we must necessarily use the homograft except in rare instances, which will be mentioned later.

We know that the life of the red blood cell in the normal individual is quite short, yet the limits of our knowledge do not permit an accurate estimate of this time. Rous,¹ after reviewing the work done by others, concludes that about 1/15 of the total blood volume is destroyed daily; the average life of a cell must therefore be about fifteen days.

We know that introduction of foreign blood

into an individual stimulates certain functions of the blood, as the subcutaneous injection of a small amount of blood for hemorrhage of the newborn, accelerates clotting, and we believe that introduction of larger amounts of foreign blood stimulates the blood producing organs to greater activity. In addition to this stimulating action, however, we must consider the blood transplanted as an active part of the functioning blood. Ashby,² at the Mayo Clinic, has demonstrated that transfused cells live longer than the normal "home grown" cells, for she finds from 40 to 50 per cent. of these are present after 28 to 52 days, and some few cells after 100 days. It is safe to assume that cells surviving for this length of time must have had active function. This active blood is particularly important in the secondary anaemias, but it must also play a part in relieving the over-worked bone marrow in cases of pernicious anaemia.

Foreign blood is useful in diseases in which the blood is greatly depleted. It is the treatment of choice in pernicious anaemia. This disease, as is well known, is characterized by remissions at times of long duration, during which, the patient shows startling improvement. It is generally believed that transfusion of blood will initiate these remissions, and thereby prolong the life and usefulness of the patient. Anders³ reports a typical case in which the red count rose from 720,000 to 2,050,000 after transfusion, and a similar improvement one year later. He collected 450 cases from the literature, 56 per cent. of which were much improved by transfusion. He very rightly warns us to use transfusion only as an adjunct to the usual medical and hygienic treatment of the disease.

In the leukaemias, transfusion seems to do harm rather than good.

In secondary anaemia, transfusion gives brilliant results, particularly where the cause of the anaemia can be corrected. It is not infrequently a life-saving procedure directly, or indirectly, by preparing a patient for a necessary operative procedure. Patients greatly debilitated by malignant disease can be temporarily made more comfortable by addition of blood to their circulation.

Transfusion is frequently necessary in shock, yet we must be extremely careful that we do not add to the shock by using incompatible blood.

In treating sepsis, transfusion of blood from

a donor immunized to the infecting organism has been tried with results no better than when the donor was not so immunized. Polak⁵ reports favorable results from frequent small transfusions in puerperal sepsis. In general, however, transfusion does little good in treating septicaemia from other causes.

In the hemorrhagic diseases, the clotting time is shortened by transfusion or by injecting foreign blood under the skin.

The results of transfusion in general are admittedly good; what then are the objections? Aside from the technical difficulties, the dangers of transfusion, while few, are very real:

1. Emboli may be introduced, either air, clots, or small foreign particles. It is my own impression that many of our reactions are due to minute emboli. This danger should be eliminated by careful technic regardless of the method used.

2. Transmission of disease from the donor. This can be obviated by careful selection and examination of the donor.

3. Dilatation of the heart. We can avoid this by careful administration of the blood.

4. Reaction to incompatible blood.

These dangers have been enumerated by Pemberton.⁵ The reaction of the patient is the most frequent and most serious danger. It varies in severity and duration. The typical reaction consists of a chill, rapid weak pulse, varying degree of collapse, difficult breathing, nausea and vomiting, and rapid rise in temperature. Severe reactions are usually due to hemolysis of red cells, and are followed by hemoglobinuria. Drinker and Brittingham,⁶ after careful observations and experiments, conclude that reactions are due to changes in the red cells, and to some extent in the platelets which occur soon after removal of the blood from the circulation. A severe reaction in a greatly debilitated patient is a terrifying occurrence, and rightly so, for not a few deaths have resulted. Unfortunately, these deaths are usually not reported. Bernheim⁷ reports two deaths and knows of four unreported. The author knows of four deaths in the hands of thoroughly trained men. All of these followed transfusion of citrated blood.

Patients who have had repeated transfusions, may develop a sensitization to the blood of a particular donor, or to any donor. In repeated transfusions, it is therefore quite important to repeat direct matching of the bloods for hemolysis and agglutination. Even when

no incompatibility is found by the laboratory, these repeated transfusions should be given carefully, and discontinued if the patient notices any unpleasant symptoms.

In contrast to this type of reaction, we have observed quite a favorable reaction in a number of patients. This reaction consists of a prompt decline of temperature after transfusion in febrile patients. One striking case, was a boy of ten years whose right kidney had been ruptured in an automobile accident. His condition was so serious from loss of blood, that an operation was considered not advisable. The hemoglobin was 12 per cent. with a correspondingly low red count. His temperature ran from 102 to 103 for several days until a transfusion of 500 c.c. of whole blood brought the hemoglobin up to 35 per cent., and the temperature to normal. After a few days, he bled again and the temperature rose, but promptly came down after another transfusion. This cycle was repeated twice again before his condition would permit an operation, which finally was successfully performed. Another case showing a similar favorable reaction, was a woman who had bled to a hemoglobin of 20 per cent. from an incomplete abortion. There was some delay in securing a suitable donor for her, and she ran a temperature from 102 to 104 without evidence of infection, until she was given 500 c.c. of whole blood, when the temperature rapidly became normal. One week later, she again bled freely, and with the bleeding had a rise of temperature. This time a similar transfusion from the same donor gave her a severe chill and sharp rise of temperature followed by a rapid decline to normal and good recovery. No infection was found to account for the fever in these patients. The intimate association of their anaemia and rise in temperature is extremely interesting.

The patient's own blood would be ideal for transfusion, but obviously is rarely available. Grant and Frazier⁸ have reported cases where a long bloody operation was anticipated by bleeding the patient, citrating the blood and keeping it in the ice-box until needed. Schweister⁹ has reported collecting blood from the abdominal cavity in cases of ruptured ectopic pregnancy, and introducing it into the vein of the patient. He reported one death following such a transfusion. This procedure seems to be quite unscientific, for much of this blood is already clotted, and minute emboli may

easily escape the filters which are available, while collecting and preparing the blood must severely damage the cells. It would appear quite unnecessary also, since Matthews¹⁰ claimed years ago that much of this blood is returned to the circulation by absorption, and Siperstein and Sansby¹¹ have recently demonstrated that this absorption is probably quite rapid; they suggest the use of intraperitoneal injection of freshly citrated blood. The rapid absorption of saline solution from the peritoneal cavity has been amply demonstrated.

The selection of the donor is extremely important. In the Hospital Division of the Medical College of Virginia, we have a group of "professional" donors from the student body. These young men have been grouped by the method of Moss; the quality of the blood is tested and the Wassermann reaction is done. After typing the recipient, the bloods are matched against each other for hemolysis and agglutination. We do not accept a Group IV as a universal donor, and would use such a donor for another group only in an emergency. Occasionally, by direct matching of patient's and donor's blood, we find a donor unsuitable although in the same group with the patient. We have not had any severe reaction in a donor. Occasionally there is a short period of faintness, but even this is not observed if the donor is kept quiet. We rarely use more than 500 c.c. of blood, and let the donor go home after a few hours. We have used the same donor twice in one week without any unfavorable symptoms.

It is quite important to consider carefully the method to be used. It is safe to say that whole unadulterated blood is the method of choice by the great majority. It has been definitely proven that reactions are much more frequent after use of citrated blood. Bernheim⁷ has studied the problem carefully, and says that after the citrate method, we may expect a reaction in 20 per cent. to 40 per cent. of cases, while after whole blood transfusion, there will be about 5 per cent.

It is impossible to give figures on mortality from transfusion, because deaths are rarely reported, but, as noted before, we must remember that no inconsiderable number have occurred. The small percentage of reactions to whole blood transfusion is the brief for this method. Against this, we must consider the ease and simplicity of the citrate method. It can be given by one man without assistance

if necessary, and under any conditions. To successfully transfer whole blood, the patient must be in a hospital and several assistants are needed. Bernheim says that the greatest good for the greatest number will come from the use of sodium citrate transfusion, but advises the use of whole blood where it is possible, and always in greatly debilitated patients. Our practice, in the hospitals of the Medical College of Virginia, is to use whole blood unless the patient is too ill to be moved to the operating room, and then we use citrated blood on account of the ease of administration.

The direct transfer of blood from artery of donor to vein of the patient is now rarely done. In expert hands, it may be satisfactory, yet even then we are ignorant of the amount of blood actually transferred. In view of the considerable technical difficulty of this procedure, and the trauma to the donor, it would seem that the more simple indirect methods should be used. Horsley, Vaughan and Dodson¹² have recently advocated the direct method and reported a number of favorable cases.

In conclusion, the methods used and found satisfactory should be briefly mentioned:

For the transfer of whole blood, we use the syringe-cannula method described by Lindeman¹³ ten years ago. His cannulas should be used where it is possible in spite of the moderate difficulty in introducing them into the vein. Not infrequently we have to cut down on the vein in order to insert them, particularly in debilitated patients and in children. The syringes are the standard 20 c.c. Record. These syringes are filled rapidly and transferred to the patient before clotting can occur; they are then washed in three basins of salt solution and are again ready for use. From six to twelve syringes are necessary.

For the citrate method, we use the technic described by Farr and Gilroy,¹⁴ in which the blood is collected in a flask containing the citrate solution. This flask is gently agitated as the blood runs in and is inverted when the blood is introduced into the patient by gravity.

To summarize, we believe that transfusion is of great value in the treatment of chronic anaemia and certain hemorrhagic diseases, and that it is a life-saving measure in acute severe anaemia from bleeding. The method of choice is that which transfers whole blood in the simplest manner with the least trauma to the donor and recipient. The value of the citrate method must be recognized, and it must be

used under certain conditions. Transfusion should be considered as a surgical procedure, and all of the preliminary tests and final technic should be carried out with the greatest care.

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TREATMENT AND PROGNOSIS OF CHRONIC CARDIAC LESIONS.*

By T. N. DAVIS, M. D., Lynchburg, Va. --

Whatever the cause of cardiac disease, decompensation means failure of the heart's muscle. The treatment, whether aimed at prevention or restoration, should be directed first, to conserve the heart's energy and second, to build up a reserve to meet the varied demands made upon it under the ordinary conditions that a patient experiences; thus, the basic principle of treatment is rest, whether accomplished by avoidance of strain, slowing up of body functions, or digitalis. In the patient with a cardiac lesion already known but whose heart is functioning normally, there are certain rules to follow that he may control his reserve force and steer from decompensation.

We will consider exercise. It is known that careful and well directed exercise accomplishes several favorable ends, but before instituted, the presence of infection must be decided, as nothing would so readily bring on decompensation as the combination of infection and exercise. A leucocytosis and temperature over 99.6° per rectum for several days are clear signs of reinfection; with these findings absolute rest in bed is first and last the only treatment until the above signs are negative. The fact should be emphasized that broken compensation is practically always the direct

result of reinfection of the endocardium with physical strain acting secondarily, lowering the resistance of the myocardium. Having this in mind, how vital it is in our treatment that we remove diseased tonsils and teeth and clean up focal infection wherever apprehended. Without enumerating the usual advantages of muscular exercise, we know that the same physiological laws hold good in the cardiac patient whose compensation is intact; whether we use massage or active and passive motion, the first effect on the heart is increase in its rate, then quickened respiration and rise in the blood pressure; by resistance offered in the peripheral arteries the diastolic pressure is raised and the circulation in the coronary arteries is improved, there is increase of the flow in the coronary arteries out of all proportion to the pressure in them; the heart obtains a richer supply of blood and muscular tone is heightened. Thus by gradual exercise we can build up a reserve, not equal to the possibilities of the normal heart, but sufficient to meet the needs of a modified life. Appearance of the face, rate of respiration, the time it takes the pulse to return to normal are signs that determine the amount of exercise that is necessary. In the beginning, interruptions or rest periods must be frequent and the limit of toleration never approached; the patient should not talk while walking, or walk against the wind; as training improves his condition games without competition can be prescribed. In children a mild supervision of their play acts better than the attempt at repression. Inactivity and a sedentary life may prove as harmful to the patient as his zeal that urges him to reach a former level of activity in work and recreation. When exercise has been instituted it must be regular and frequent.

In impending or actual decompensation get the patient to bed. Orthopnoea may prevent complete dorsal relaxation; here a semi-erect position will be of advantage in gravitating the contents of the blood vessels to the lower extremities; this posture permits the blood to drain from the myocardium. Such grave signs as cyanosis and collapse call for venesection; the withdrawal of as much as thirty ounces will give time for quicker stimulation as ether or caffeine, etc.

Rest alone may be all that is necessary to control symptoms; it gives the heart time to hypertrophy to meet the new situation. Where there is dropsy or anasarca, digitalis will act

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more quickly when effort is made to eliminate through the bowels; calomel first, then magnesium sulphate, an ounce in black coffee every morning for three days, when digitalis is commenced. I believe it is fairly well comprehended that larger doses of digitalis must be administered; when so given there is a saving of several days in the approach to compensation. The massive dosage advocated by Eggleston is not suitable usage outside the hospital. Remember that ordinarily it takes two to three drops as measured by a medicine dropper or from the bottle to make the official minim of the U. S. P. tincture. Ten minims should be given three or four times a day, until digitalization is attained or signs of heart block—nausea, vomiting, dropped beats—appear. The ventricular rate should be around seventy; other signs of effectiveness of the drug are increase in the output of urine and increase of pulse pressure. After the above has been established, a proper dose to keep up the good result must be continued. The elimination of digitalis or average rate of disappearance from the body is twenty-two minims per day, so that ten minims morning and night can be safely given indefinitely. The patient may find that he cannot be comfortable without a daily dose of digitalis, probably ten minims. It is remarkable how in some cases the cardiac equilibrium is kept by a daily dose, and upset when left off. If digitalis fails to keep the patient comfortable, it may be tried intravenously for several doses; a new hold, so to speak, may be gained, the myocardium once more responding. Subsequently oral administration may be resumed.

Edema if uninfluenced by elimination through the bowels and digitalis medication may be overcome by the administration of theobromin sodio-salicylate. Twenty grains should be given every four hours for four doses the first day; the following day four doses of thirty grs., then stop for several days, when it can be given again if edema accumulates.

Morphine should never be withheld from these patients; it is supreme for the psychic and physical distress, relieving pain and allowing sleep which is the thing most desired. Nitroglycerine can be relied upon to allay lesser symptoms of dyspnoea, anginoid and constrictive sensations in the chest. When the outlook is hopeless on account of absolute ex-

haustion of the heart, morphine and nitroglycerine still relieve until the end.

The Karel treatment, consisting of milk about six ounces every four hours, is an ideal diet when the patient is first seen; it may be reinforced by the addition of milk sugar, a teaspoonful with each feeding, the sugar giving more nutrition and enhancing the diuretic action of the milk. Often the cardiac patient has a renal insufficiency and acidosis may be a factor in the production of dyspnoea. The addition of sodium bicarbonate and milk sugar with the four hour feedings increases the therapeutic value of the treatment. The Karel diet can be given five or six days if of benefit. When a change is decided upon, the choice would be a baked potato replacing one or two feedings of milk. Gradually other articles are added; a small piece of steak or lamb chop and a slice of tomato are particularly appetizing after the milk cure. Salt should not be allowed except what is naturally contained in the food. Diet is next to exercise in importance. A cardiac patient should have small meals, four to five a day, rather than three of the usual size. Over filling of the stomach may be disastrous; a patient should so eat that on arising from the table he is not conscious of his stomach; on the other hand, going a long time without food is equally as bad as over eating. Try to keep the patient ten to fifteen pounds under his former weight.

Prognosis should be based more on the cause and type of heart lesion. In the rheumatic heart the number of attacks and number of valves involved concerns us first; then the age of the patient. Prognosis is better if the patient is beyond twenty-one, as reinfection is less apt to occur. Involvement of the mitral valve-stenosis, the usual lesion of rheumatic endocarditis, while crippling the heart, not necessarily limits a patient's activity. It is possible for him to go on through several decades without symptoms at all; indeed it is only where arterio- or cardio-sclerosis sets in that there are objective symptoms of a heart lesion. Many women pass through pregnancy without their physician aware of this lesion in them. On the whole, though men tolerate valvular defects far better than women, the latter withstand hypertension and cardiac hypertrophy with little inconvenience.

Height and weight should be taken into account. Generally the tall and large person has

not the same prognosis as the small and lean type. This latter individual is almost, sure to live longer.

In the luetic heart which practically is secondary to a luetic aortitis, basing the prognosis on the morbid anatomy,—aneurism with rupture, coronary involvement with occlusion, you can say the outlook is bad. If anticipated, the arteriosclerotic or degenerative type of heart offers a better outlook; unless interrupted by the advent of apoplexy, angina pectoris or nephritis, these patients have few discomforts, except those of encroaching old age.

Prognosis in the hypertrophied heart of chronic nephritis is entirely dependent upon the extent of disease in the kidney. If the heart is normal, with the exception of enlargement, it does not give cause for concern, death usually being due to uremia, or apoplexy the result of rupture of an artery from hypertension. Much can be learned from the response of a heart to rest and digitalis. The result of treatment is in direct proportion to the integrity of the cardiac muscle; when drug and dosage are potent and there is little or no response, the prognosis can be counted poor. Response also to exercise, by the degree of dyspnoea, gives valuable information.

Where foci of infection are discovered concomitant with the heart findings, not only is their removal indicated but the prognosis is usually bettered likewise.

No single symptom or sign that we assume points to an ill functioning heart can enlighten us in regard to termination; the physician should determine prognosis from the signs and symptoms as a whole which is equivalent, practically speaking, to the patient's response to the routine of his daily existence. The one exception to the above statement is the finding of pulsus alternans which is ominous, death occurring generally within two or more years.

CHRONIC CARDIAC DISEASES—PATHOLOGY AND DIAGNOSIS.*

By F. C. Rinker, 'A. B., M. D., F. A. C. P., Norfolk, Virginia.

Chronic valvular heart disease is found in general practice to exist in about five per cent. of all cases.

I will attempt to consider first the pathology and diagnosis of the various valvular lesions, confining myself entirely to the heart proper, and lastly, I will take up the general patho-

logical effects of these lesions on the musculature of the heart.

It is frequently argued that careful study of valvular lesions, from the standpoint of differentiation of the various valves affected, is of minor importance and that loss of compensation is the all important feature. While this is true to a certain degree, there are differences in the symptoms and signs of the many lesions and, therefore, differences in the resulting pathology and the prognosis. This should impress upon us the necessity of closely studying each valve lesion.

Let us consider the valvular lesions in the following order:

1. Mitral Stenosis.
2. Mitral Insufficiency.
3. Aortic Stenosis.
4. Aortic Insufficiency.
5. Tricuspid Stenosis.
6. Tricuspid Insufficiency.
7. Pulmonary Stenosis.
8. Pulmonary Insufficiency.

I. MITRAL STENOSIS.

Pathology: There are three varieties (a) Infections, (b) Arteriosclerotic (c) Congenital.

Of these, the first is the most common. In this type the edges of the mitral valves are roughened by vegetations, the result of endocardial inflammation. In addition, there is thickening of the valves which results in difficulty in closure.

The arteriosclerotic type is met with more commonly in old age and is merely a thickening of the valve leaflets due to the tissue change of age.

The congenital form is rare and may be due to mal-development during fetal life or may be due to hereditary syphilis.

The earliest effect of mitral stenosis is hypertrophy of the left auricle followed by dilatation and finally there is hypertrophy and dilatation of the right ventricle.

Diagnosis: There is usually little difficulty in making a diagnosis in cases of mitral stenosis. The thrill and presystolic murmur heard over the precordial area not transmitted are the main diagnostic points. We must always be alert, however, for the murmur is variable as to time; it may be presystolic or it may be heard in diastole, it is *not* transmitted.

Mitral stenosis is to be differentiated from:

1. That of aortic regurgitation.

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2. The Graham Steele murmur which is heard over the left third and fourth interspaces.

3. The murmur of pulmonary insufficiency which cannot be differentiated from the Graham Steele murmur.

4. Tricuspid stenosis, a very rare condition.

5. The so-called Austin-Flint murmur heard in some cases of advanced aortic regurgitation.

II. MITRAL INSUFFICIENCY.

Pathology: The post-mortem changes found are; sclerotic, vegetative and ulcerative alterations of the mitral cusps. The left auricle is at first hypertrophied and then dilated and there is dilatation and later hypertrophy of the ventricle.

Mitral regurgitation may also be the result of dilatation of the heart without endocardial disease known as relative insufficiency.

Diagnosis: Systolic murmur heard best over the apex of the heart and transmitted to the left axilla and to the angle of the left scapula are diagnostic signs. The murmur may, however, be heard best at the base of the heart in some cases. In addition to these signs there is usually enlargement of the left heart, and a marked accentuation of the second pulmonic sound.

The murmur of mitral regurgitation is seldom mistaken for any other organic heart lesion. It must, however, be differentiated from the hemic murmurs, the functional murmurs due to cardiac position adhesions, etc., and from arteriosclerotic murmurs, heard so frequently at the base of the heart, none of which are transmitted. It must also be distinguished from the cardio-respiratory murmur which is frequently transmitted but is heard only during respiratory excursion. In rare instances acute pericarditis and patent ductus arteriosus offer puzzling differences, but the nearness of these murmurs to the ear and the to-and-fro quality distinguish mitral insufficiency from them.

III. AORTIC STENOSIS.

Pathology: The aortic leaflets are found to be thickened and covered with vegetations or ulcerations; in some instances there are found calcareous deposits in the cusps. The valves feel hard and sclerosed.

The left ventricle first hypertrophies and may later dilate. When dilatation of the left ventricle does occur there results a relative mitral insufficiency.

Diagnosis: The region of the base of the heart has been well named "the region of romance." Aortic stenosis is the one organic heart lesion in which the greatest care should be exercised in diagnosis. The murmur is heard best over the second interspace to the right and is transmitted to the vessels of the neck; it is systolic in time and there can usually be felt a thrill over the aortic area. The second aortic sound is feeble or absent, and the left heart is enlarged.

Atheromata of the aorta, pressure on the aorta from mediastinal tumors, hemic murmurs and pulmonary stenosis must be differentiated from aortic stenosis.

To repeat, there are four findings which are requisite as a basis for the diagnosis of aortic stenosis, as follows:

1. A systolic thrill at the base.

2. A slow deliberate pulse.

3. A systolic murmur heard at the second right interspace and transmitted to the vessels of the neck, and

4. A feeble or absent second aortic sound.

IV. AORTIC REGURGITATION.

Pathology: The pathology differs somewhat with the cause. In the syphilitic cases there is an inflammation of the small arteries at the base of the valves and plaques are found on the valves. In the *infectious* cases vegetations are found on the valve edges, and in the *arteriosclerotic* types there is a sclerosis of the cusps. The left ventricle first dilates and then hypertrophies. Aortic insufficiency causes more marked enlargement of the left ventricle than does any other heart lesion.

Diagnosis: The diagnosis of aortic insufficiency is usually easily made. In no other cardiac lesion are there as many peripheral vascular signs which aid in the diagnosis as are found in aortic regurgitation. The cardinal points in diagnosis are:

1. A murmur, occurring during diastole, heard best over the second right costal cartilage and transmitted downward and to the left, to the apex of the heart.

2. Marked increase in left cardiac dullness.

3. Peripheral signs: (1) Corrigan's water-hammer pulse, (2) Blood pressure changes in arm and leg, (3) Capillary pulse, (4) Duroziez sign (pistol shot murmur).

This murmur is sometimes taken for mitral stenosis, pulmonary insufficiency, aneurysm, and mediastinal tumors.

Electrocardiogram is of value and shows

evidence of left ventricular preponderance of marked degree.

V. TRICUSPID STENOSIS. The pathological findings are identical with those found in mitral stenosis affecting the tricuspids.

Diagnosis: This valve lesion is rarely recognized except at autopsy.

The region of the heart dullness is increased to the right due to dilatation of the right auricle, sometimes there is a presystolic thrill. There is a short presystolic murmur heard just to the right of the sternum in the fifth interspace.

Mitral stenosis is frequently associated with tricuspid stenosis and it is most difficult to differentiate the two. In the former the murmur is heard loudest about the left nipple region of the chest while in the latter the murmur has its greatest intensity to the right of the sternum and in the mid-sternal region in the neighborhood of the fifth interspace.

VI. TRICUSPID INSUFFICIENCY. The pathology is similar to that described under mitral insufficiency.

Diagnosis: 1. There is bulging of the precardial region at times. 2. Cyanosis and venous engorgement are present. There is marked venous pulsation. 3. A systolic pulsation can frequently be felt over the right side of the heart. 4. Pulsation of the liver when felt is pathognomonic. 5. Enlargement of cardiac dullness to the right. 6. The electrocardiogram shows right ventricular preponderance.

VII. PULMONARY STENOSIS: This lesion is almost always congenital.

Pathology: The post-mortem changes are identical with those found in aortic stenosis. Hypertrophy of the right heart occurs and is soon followed by dilatation of the auricle and ventricle.

Diagnosis: A systolic thrill felt at the base of the heart, increased cardiac dullness to the right, and a systolic murmur with its maximum intensity heard over the second left interspace close to the sternum constitute the cardinal signs of diagnosis.

Basal heart murmurs should always be carefully studied before making a diagnosis of pulmonary disease because this condition is rare and functional basal cardiac murmurs are frequent.

VIII. PULMONARY REGURGITATION: This condition is rare. Up to 1910 Norman Pitt

had been able to collect only ten cases reported in the literature.

Pathology: The changes found in the pulmonary cusps are identical to those found in cases of aortic regurgitation.

Diagnosis: A diastolic murmur, best heard at or near the left second costal cartilage transmitted downward only slightly with increase in dullness to the right at the base of the heart, is the diagnostic sign.

The absence of left ventricular hypertrophy and the peripheral signs of aortic regurgitation assist in differentiating it from this lesion.

Having considered each valvular lesion of the heart separately, let us now turn our attention to the effects of these various conditions upon the nervous mechanism and musculature of the heart.

To quote Mackenzie: "Unfortunately, most of the changes that occur in the myocardium show no signs or symptoms by which we can recognize them. Nevertheless, there are a number of manifestations which we can refer to the muscle of the heart, such as various irregularities of the heart's action, changes in the size of the organ, and it may be the character of the sounds." (Mackenzie, Sir J., Lvd. 1916. 121.)

Definite evidences of these changes may not be demonstrable, but by study of the heart's efficiency we are able to obtain indirect evidence.

The most important pathological conditions arising in the myocardium are dilatation and hypertrophy. These frequently result in irregular action of the heart rhythm.

Dilatation of the Heart is manifested by dyspnoea, vomiting, syncope, and the usual decompensating signs of acute cardiac failure.

This condition may result from sudden strain or it may be the result of valvular incompetency occurring particularly early when strain is thrown on a chamber of the heart during diastole, as in aortic regurgitation.

The diagnosis of such a condition is not difficult.

Hypertrophy of the Heart: Clinically, this condition renders a more difficult problem than does dilatation. The electrocardiogram furnishes an important means of determining the preponderance or hypertrophy of a given chamber of the heart and renders information valuable from the viewpoint of both therapy and prognosis. For example: In

cases of left ventricular hypertrophy or preponderance there is an inversion of the R-wave in the electrocardiogram in Lead-three, and where there is hypertrophy of the right ventricle the electrocardiogram shows inversion of the R-wave in Lead-one. Should the auricles be hypertrophied, then the P-wave of the electrocardiogram is of high amplitude and peaked in more than one lead. These conditions cannot be determined definitely by any other means.

Irregularity in Rhythm: There are two distinct pathological varieties of irregularities which may occur in the heart: Auricular Fibrillation and Heart Block.

Auricular Fibrillation is, as the term implies, a fibrillation of the auricles which beat much more frequently than the ventricles. This is associated with ventricular irregularity. It is due to some alteration or interference with the sino-auricular node or pace maker. The impulses arising in this node are too frequent to be transmitted by the auriculo-ventricular bundle and consequently ventricular irregularity occurs. The auricles do not contract but remain in a state of twitching and act only as reservoirs.

Heart Block: The transmission of impulses through the auriculo-ventricular bundle of His may be interrupted by the invasion of disease in the bundle, or in either of the bundle ventricular branches.

Heart block is complete or partial dissociation of His bundle action. The ventricle does not receive the impulse from the pace maker but assumes an impulse and beats independently, slowly and at times irregularly.

One may assume heart block as a diagnosis whenever the heart rate is less than forty beats per minute. The condition, however, frequently exists with a much more rapid pulse rate and can only be definitely determined by the electrocardiogram.

There are other conditions affecting the cardiac rhythm but time does not permit a discussion of them in this paper.

In conclusion, let me urge that whenever possible, in the study of chronic cardiac lesions, all means of precision be used and that a careful consideration be given the efficiency of the heart muscle in each case.

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Sarah Leigh Clinic.

X-RAY AND RADIUM TREATMENT OF THE INFECTED TONSILS AND ADENOIDS *

By E. U. WALLERSTEIN, M. D., Richmond, Va.

The subject is one that demands our attention for the tonsil question is one of the most important in our specialty. Daily we are called upon to decide whether tonsils are diseased, their relation to a systemic disorder, and what procedure should be initiated.

At present the standpoint of a large majority of us is that if the tonsil is chronically infected surgical removal is advised, provided there is no grave contra-indication to operation.

A tonsillectomy both from the standpoint of surgical technique and possible complications is a major operation. This idea now obtains in the profession and is gradually being recognized by the laity. Therefore, if there is a non-surgical procedure that will cure infected tonsils it is a most important step forward.

Until recently the other means employed in treating tonsils when tonsillectomy was not done have been tonsillotomy, cauterization, electric desiccation, suction, massage, and topical application of medicaments. These are unscientific from a pathological viewpoint and are rapidly going into disuse.

In studying the effect of X-ray on the susceptibility of experimental animals to cancer it was discovered that cancer could be produced in radiated animals, whereas this was not possible in controls. In seeking for an explanation, it was found that the blood underwent changes: that in the animals treated with X-ray the lymphocytes were markedly decreased in number; and that probably the mononuclear elements of the blood stream bore some relation to cancer immunity.

It was further shown that the roentgen ray has a selective affinity for the lymphoid elements. By properly graduated dosage it was demonstrated that this class of cells could be made to disappear from the blood, leaving the other elements unaffected. This fact was taken advantage of in the treatment of lymphatic leukemia. Based upon these observa-

*Read before the Richmond Society of Ophthalmology and Oto-Laryngology.

tions, Murphy, Witherbee and others at the Rockefeller Institute determined to apply X-ray to the tonsils.

The tonsil parenchyma consists of lymphoid cells arranged in lymph nodules. The character and number of nodules vary in the different types of tonsils. In the large soft tonsil of simple hypertrophy the number and size of the germinating follicles are increased; whereas in small fibrotic tonsil the lymphoid cells are decreased, due to the encroachment of connective tissue.

In the original article Murphy and Witherbee report forty-six cases of infected tonsils treated by the roentgen ray. They pointed out that lymphoid tissue is the most susceptible to X-ray of all tissues except the sex glands. In this series treatment consisted of a single long exposure to the X-ray in all cases, except one which was more frequently treated. The cases were not selected from any special group as far as age or disease due to infected tonsils. A cure was reported in all but four cases. In general there was a definite decrease in size of the tonsil within two weeks, with a further decrease for one to two months.

In a study of the bacteriology made by cultures of the crypts and naso-pharynx in thirty-six cases, the streptococcus and staphylococcus hemolyticus was found in thirty-two cases. These organisms disappeared within four weeks. The beneficial results of treatment are explained by the authors thus, "It seems probable that the disappearance of infection of the tonsils and changes in the bacteriological flora after X-ray treatment are due to the opening up and proper drainage of the crypts which follow atrophy rather than the actual removal of lymphoid tissue." An advantage is claimed over surgical removal in that X-ray treatment completely removes the lymphoid tissue from the lateral and posterior walls of the pharynx.

The adenoids are inaccessible to X-ray treatment on account of their position. To quote the above article "The adenoid tissue is, as expected, in view of the portal of entry used for the X-rays, not so uniformly reduced as the tonsil. This particular aspect of the problem of reducing excessive lymphoid tissue in the naso-pharynx through X-rays is one to which in the near future especial attention will need to be given."

The objections that there is danger of setting up a parotitis or that neighboring tissues will

be injured is not a real one, according to these authors, as the dosage is no higher than that used in therapy of enlarged glands of the neck.

They draw the conclusion, "The X-ray method of treating chronic focal infections of the throat, namely tonsils and adenoids, is not only safe and permanent but will more thoroughly and completely remove this focal infection than any other method yet devised, surgical or otherwise, and furthermore the contra-indications for operation in no way interfere with this procedure."

Since this original article appeared reporting the results of using a single large dose, Witherbee has changed the dosage. He now advises multiple applications, the average case requiring eight treatments at two weeks intervals.

Waters and his associates at Johns Hopkins conducted an investigation and report less favorable results than Witherbee. The number of cases studied was twenty-one, including ten children. Seven patients were lost sight of and fourteen were studied thoroughly. Treatment consisted of four X-ray exposures, about two a week for two weeks then a rest of two weeks and a second course of four treatments. Anatomically, by actual measurement, the tonsils were reduced in size in all but one case. The clinical symptoms in the cases of the ten children subsided.

Among the cases treated was one of Sydenham's chorea which was much improved and a case of chronic arthritis in a woman of fifty-six was benefited locally and generally. In this case, interestingly enough, the tonsils were not reduced in size and streptococci were still present at the end of treatment.

An interesting case showing the effect of the roentgen-ray on tonsillar tissue was that of a student with acute catarrhal otitis media. X-ray was applied and after the fourth treatment an X-ray dermatitis developed. Twenty-seven days after the fourth treatment, the tonsils were enucleated and examined by the pathologist. The report was "Pathological section of one of the tonsils showed that apparently the germinal centres were not affected by the X-rays but that the lymphoid cells between the germinal centres disappeared and their place was taken by fibroblasts."

The Hopkins group report "forty per cent. successes of which we have no proof of per-

manence." Their attitude towards the present use of X-ray of systemic absorption is as follows; "It will require many cases to determine the effectiveness of roentgenotherapy in removal of chronic focal infection in tonsils that are giving rise to a general constitutional malady, such as arthritis, glomerular nephritis, etc. In view of results as brought out in the section on bacteriology, it would amount to malpractice to resort to X-ray treatment alone when surgical removal might save the patient."

By careful and repeated serial cultures it was shown that the X-ray cannot be relied upon to cause the disappearance of streptococci.

Eight cases were studied bacteriologically of which seven were found to harbor the streptococcus. In three cases the streptococcus persisted weeks after the termination of treatment.

That cultures from the crypts cannot be depended upon was shown by Pilot and Davis who, out of a series showed sixty-one per cent. streptococci by crypt culture. The cases were later operated upon and cultures taken directly from the interior of the enucleated tonsils showed ninety-seven per cent. streptococci. Furthermore, Bloomfield and Davis have shown that a normal individual, if serially cultured, will eventually show the presence of streptococci in the throat. In the summary they state "It is possible when the technique is perfected roentgen ray or radium treatment will entirely supplant surgical measures in children."

Pacini, in the *Journal of Radiology* for April, 1922, states that the roentgen ray alone is not capable of counteracting all types of infection. He divides abnormal tonsils into three groups and gives a different kind of treatment for each. To the first group belongs the simple hypertrophies of children. X-ray alone is advised for this group. The second he terms the immunological active which he would have us treat with X-ray and the violet ray. The third group is the infected, and for this he advises surgical removal.

The obvious objection to this plan of treatment is that it is impossible to correctly determine to which group any one tonsil belongs.

Simpson, in an article in the *VIRGINIA MEDICAL MONTHLY*, November, 1921, advises the conjoint use of X-ray and radium. He con-

cludes, "I am positive that I can cause a complete atrophy and disappearance of any tonsil in one to three treatments."

Withers, in the *Laryngoscope* for March, 1922, advocates the use of radium. He points out that radium has the advantage over the X-ray in that the quantity of radiation is not so variable and that use can be made of the beta rays which have a direct bactericidal effect. Moreover, its use, he claims, has none of the dangers of roentgen-therapy.

At variance with the findings above quoted is that of Lederer of the clinic of Beck at Chicago. He writes, "In no case in our series were there any very marked changes and only in children with typical hypertrophied tonsils have we been able to note even a slight change in size." He reports that the bacterial flora was not changed in the cryptic type and that fibrotic tonsils were not affected. It is further pointed out that often a "dry throat" results from treatment.

Coakley, in the latest edition of his book, says "Radiotherapy has been recently advocated, but from our observations and those of others, it may reduce the size of the tonsil, more or less, yet it has not resulted in freeing the tonsil from harboring pathogenic organisms and the consequent local and constitutional effects thereof."

It will be seen that there is no unanimity of opinion. In fact, views are antipodal, varying from that of some who claim that X-ray is an infallible therapeutic measure of universal application to that of others who believe it valueless.

What then should be our attitude? Granted that the roentgen ray and radium can effect a reduction in size of the tonsil, does the simple reduction of size effect a cure? Granted that streptococci can at times be made to disappear from the crypts, has it not been shown that this does not mean a disappearance of bacteria from the parenchyma of the tonsil?

The adenoids, on account of their location, are not greatly affected by the X-ray. Are they not as important or more important than the tonsil in many cases, especially in children?

Consequently, from the evidence adduced to date, I cannot see any indication for the use of either X-ray or radium in the treatment of tonsils, except in those cases in which operation is contraindicated. In such constitutional diseases as diabetes, advanced pulmonary tu-

berculosis, severe cardiac decompensation, hemophilia, etc., it may possibly be of value but otherwise surgical removal is indicated.

114 North Fifth Street.

THE BACTERIOPHAGE.*

By E. C. L. MILLER, M. D., Richmond, Va.
Professor of Bacteriology, Medical College of Virginia.

As you are all probably aware there has been discovered recently what seems to be a disease which attacks and destroys bacteria. The organisms are too small to be seen with the microscope and will pass through filters which hold back all bacteria. Bacteria attacked by this disease are not only killed but are completely disintegrated or dissolved; hence, the name, bacteriophage from the Greek phagein which means to eat or devour. The organisms seem to be strictly parasitic, growing only in young cultures of bacteria. If a young bouillon culture of bacteria about three or four hours old be inoculated with a suitable bacteriophage, the growth soon ceases and the cloudy bouillon becomes clear. Some of the clear material added to another young culture again causes the bacteria to dissolve and disappear. This sort of transplanting can be continued indefinitely. Already 1500 consecutive transplants have been made and the activity of the bacteriophage tends to increase rather than diminish in spite of the enormous dilution. If such a dissolved culture be greatly diluted and then added to an agar culture heavily inoculated on the surface with the bacteria, certain spots appear on which the bacteria are unable to grow, presumably, because at these points bacteriophages lodge and destroy the bacteria. If one attempts to make subcultures of the bacteria from one of these spots, no growth results; if from a remote area, normal growth results; and if from the edge of the spot, a ragged and irregular growth is produced indicating a mixture of bacteria and bacteriophage. Ordinarily, a bacteriophage attacks only one kind of bacteria though it is possible to train it over gradually to attack another species, especially a closely related species. Bacteriophages seem to be entirely indifferent to oxygen; they act just as well in the absence as in the presence of air.

Such, in a summary way, are the essential facts which have been discovered recently;

now something about what this discovery may signify.

WHERE IS THE END?

Bacteria have seemed to us right small creatures and if bacteria can have parasites and diseases it reminds us of de Morgan's lines:

"Large fleas have little fleas
Upon their backs to bite 'em;
These little fleas have lesser fleas
And so ad infinitum."

Can this thing go on ad infinitum? Can these parasites of the bacteria in turn have lesser parasites on them? To help answer this question I wish to build a stair-case down into the world of the minute. (See table page 181).

The large protein molecules are probably about one micro-micron in size so that there is only one order between a protein molecule and the limit of the microscope in which this bacteriophage can be placed (0.01) micron. Being only ten times the diameter of a protein molecule it could contain only 1,000 protein molecules or their equivalent. Can life with all of its complex activities be organized out of the equivalent of 1,000 molecules of hemoglobin? Possibly, but this certainly seems to be the minimum and it does not seem possible that this parasite of the bacteria can have a "lesser flea" to bite it.

IT MAY SIMPLIFY THE STUDY OF FILTRABLE VIRUSES.

As you are well aware, it has been known for several years that many of our common and important diseases are caused by the filtrable viruses, that is by organisms too small to be seen with the microscope. There are about forty of these and among them are measles, scarlet fever, mumps, smallpox, typhus fever, trench fever, acute anterior poliomyelitis and rabies.

Very little progress has been made in the study of these organisms because they can be recognized only by allowing them to produce the disease in animals which is a very slow and unsatisfactory procedure. Here seems to be a similar organism which can be recognized in a few hours by simply adding it to a culture of bacteria. This greatly simplifies the technique and may result in a rapid increase in our knowledge of these creatures.

IT MAY ASSIST US IN COMBATING PATHOGENIC BACTERIA.

If we have discovered a natural enemy of bacteria, one that can destroy them promptly

*Read before the Richmond Academy of Medicine and Surgery, February 13th, 1923.

1.0	meter—The world of man and higher animals.
0.1	meter—Song birds.
0.01	meter—Insects.
0.001	meter or 1.0 millimeter—Fleas.
	0.1 millimeter—Limit of vision; chiggers.
	0.01 millimeter—Body cells; the red blood cell=0.07.
	0.001 millimeter or 1.0 micron—Bacteria.
	0.1 micron—Limit of microscope; visible light=0.8—0.4.
	0.01 micron—Colloid particles.
	0.001 micron or 1.0 micromicron—Protein molecules.
	0.1 micromicron—Atoms and most molecules; X-rays
	0.01 micromicron—Gamma rays of radium.

and effectively in the body, it may, in time, prove a valuable ally in our fight against disease. It is easy to see that such co-operation between man and the bacteriophage would place the bacteria in a very difficult situation, between two fires, as it were, being obliged to fight, not only the defensive operations of the patient's system, but also this insidious enemy in their own midst. From our standpoint as physicians, it opens the possibility of being able to supply, to the patient, a quantity of these creatures all trained to destroy any particular bacterium that may be trying to injure the patient.

IT MAY CONTROL EPIDEMICS.

Very little has been accomplished so far in the direct treatment of disease in man, by bacteriophages, but some progress has been made in studying epidemics among animals. The first bacteriophage found was recovered from the stool of a human patient convalescent from dysentery and it is generally true that the best place to find any particular bacteriophage is the stool of a patient recovering from that disease. A portion of the stool is suspended in salt solution, incubated over night, and filtered to remove all bacteria. The clear filtrate contains the bacteriophage. In an epidemic it frequently happens that no bacteriophage can be found in the early cases; later when the epidemic is on the wane bacteriophages can be found. A few naturally occurring epidemics among animals have been rather carefully studied and the role of the bacteriophage seems to be about as follows: In the healthy animal the bacteriophage seems to be living in a sort of quiescent equilibrium with the host. It may be confined to the intestinal tract or it may be scattered all through the body. When the new bacterium (the cause of the epidemic) invades the animal, the bacteriophages at once begin to adapt themselves to this new germ which has appeared in large numbers. They probably do not help that first case any, but before that case dies, they have acquired some

adaptation to the new germ, they have increased in numbers and they are scattered, along with the epidemic bacteria, to other victims. Here, they again increase in numbers, they become better adapted to the new germ and they are more widely scattered to other members of the community. Thus it comes about that after a time many, or most of the individuals in the community are supplied with bacteriophages able to cope with the new germ and the epidemic dies out. In an epidemic of fowl-typhoid the stools of the sick and dying chickens were examined daily for bacteriophages. At first, none are found that would attack the organism causing the epidemic, but as soon as a virulent one was found the epidemic died out and the survivors then all showed virulent bacteriophages for that bacterium. A number of similar epidemics have been cut short by injecting all the chickens with a bacteriophage virulent for the causative organism.

Some work has been done in protecting the water buffalo from an epidemic disease called "barbone." This is caused by a germ belonging to the hemorrhagic-septicemia group. Several epidemics have been cut short by injecting a bacteriophage virulent for the barbone bacillus. It has also been shown that not only are the buffalo protected against the natural infection, but they have been able to resist an injection of an enormous dose of the bacteria—in fact they have withstood the injection of 1000 times the known fatal dose of the bacteria.

If this work is confirmed, it will provide us with an explanation of why an epidemic stops of its own accord. In the laboratory we know that pathogenic germs tend to increase in virulence when they are passed through a series of animals. From this, we would expect an epidemic to keep getting more and more virulent. As a fact, it does not do so, but quite to the contrary, soon gets less virulent and dies out of its own accord. Even the

world-wide influenza epidemic instead of completely exterminating the human race, as we might have expected it to do, quietly died out or died down to very modest proportions. In the past all we have been able to say in explanation has been that all the susceptible material had been used up; but why one person should be susceptible and another not, we could not say. Now it appears that one was susceptible because he had no bacteriophage to guard him and another was immune because he was equipped with a bacteriophage able to destroy the epidemic organism. If it is correct to call such resistance immunity and if we recall that the bacteriophages are scattered to the members of the community much as are the bacteria, then we can say that one "catches" his immunity in the same sense that he "catches" the disease. Whether he really has the disease or not depends on which he "catches" first.

IS IT ALIVE OR NOT?

So far, I have assumed that this bacteriophage is an organized living creature of minute size because that seemed the simplest way to present it. However, it is no more than fair that I should inform you that the scientific world is by no means agreed that it is living. Many of those who have worked with it regard it as an enzyme. D' Herrell, who was the first to work with it, and who has done far more than anyone else, is fully convinced that it is living. Most of the American writers consider it an enzyme.

The two strongest points in favor of its being a living organism are its ability to increase indefinitely (10^{1500}) and its ability to adapt itself to changes in its environment (adaptation to a new bacterium). In favor of its being an enzyme are first, the fact that in its resistance to certain antiseptics it resembles an enzyme more than any known living organism; second, the fact that similar lytic agents have been found or produced in cultures of bacteria under circumstances which seem to preclude previous contamination. This, of course, means spontaneous generation and it is easier to consider the spontaneous production of an enzyme than it is to consider the spontaneous generation of life; and third, its very small size seems to accord better with an enzyme molecule than with an organized living being. Every one admits that it is capable of perpetuating itself indefinitely and it is rather

difficult to think of an enzyme doing this. We have usually considered self perpetuation as one of the prerogatives of life. However, it may be possible to have a self perpetuating enzyme.

It is rather interesting from a biological standpoint that the scientific world cannot determine whether the thing is living or not.

However, from a practical standpoint, it does not matter. All are agreed that it does the work: it destroys bacteria and it can be trained to destroy any particular kind we desire. Hence, whether alive or not, we should be able in time to utilize its power to destroy our constant enemies—the germs.

DENTAL RECLAMATION THROUGH MEDICAL REVOLUTION.*

By JOHN BELL WILLIAMS, Ph. G., D. D. S., Richmond, Va.
Professor of Dental Pathology, Medical College of Virginia,
School of Dentistry.

"I have always thought it a greater happiness to discover a certain method of curing, even the slightest disease, than to accumulate the largest fortune."
—Sydenham.

With the trend toward organized group practice in our hospitals, the necessity for procuring the benefits of dentistry has been so amply displayed that it would appear presumptuous for him whose name is here subscribed to imagine himself capable of adding anything new to so exhausted a subject. This necessity in the treatment of disease is not at this time subject to controversy!¹

Step by step, dentistry and medicine have developed apart and have come back to the same road from which they both started, amongst the early Egyptians when there were "those practitioners for the eyes, those for the head, some for the teeth, others for the belly and for occult maladies."²

According to tradition, dental surgery had its origin with Aesculapins, the god of medicine.³ Hippocrates invented forceps and other dental instruments and established principles of interdental and inter-maxillary fixation for treating fractures of the maxilla and mandible which are used by modern practitioners. These principles of Hippocrates have stood the test of the ages, being proven anew with each recurring war. Although they strongly opposed bandaging, there are those who still cling to this antediluvian method of extra-oral fixation. One would almost suspect such persons of cher-

*Read before the Virginia State Dental Association in Richmond, October 19, 1922.

ishing a surreptitious belief in "touching" for "the King's Evil." Aristotle included the mouth in his studies. It may have been for purely personal reasons that the importance of this indispensable factor to politics was perceived, but it was for scientific reasons that his research was pursued. Cornelius Celsus emphasized the danger of the performance of mouth operations by unskilled men. While Galen contributed much to dental knowledge, his error in dubbing the pulp "nerve" remains as a monument to ancient science and as an antiquity to modern science.

Abulcasis, the medieval genius of Arabian surgery, attached great importance to scrupulous mouth hygiene and the early treatment of pyorrhea, while the English representative of this period, John Gaddesden, recommended the application of cow's dung to correct dental disorders.⁴ However, we do not consider this seriously, regarding it rather as an Englishman's weakness for advertizing all products of John Bull than as a constructive step in dental history. The greatest surgeon of the middle ages, Guy de Chauliac, was the first to recognize dentistry as a specialty of medicine, but his treatment of the medical offspring thus sent into the world to gain his spurs, was rather of tolerance than serious consideration. Hence, dentistry may be considered the forerunner of the modern tendency toward specialization in medical branches and, up to recent years, has been treated by the parent profession with the condescension bestowed upon dissenters.

During the sixteenth century Fallopius gave to us an account of the dental follicle and Eustachius occupied himself in the study of the teeth writing the first book on their anatomy. Ambrose Paré, the father of modern surgery, acquired his first technical skill from the performance of mouth operations. The layman's attitude toward the profession during this period was anything but complimentary, for Shakespeare designated the dentist as a "tooth drawer" and described his profession as "a kind of unconscionable trade, because his trade was nothing else but to take away those things whereby every man gets his living." An interesting commentator relates that surgeons as "uneducated men and associated with barbers as well as apothecaries were prohibited from practicing physic." Even prior to this Chaucer had not spared the physician and his description is anything but flat-

tering. "The English physician according to the poet was a man addicted to astrology and magic; glib of speech, with abundant assurance; in league with the apothecary to make the most out of his patients; indifferent to religious matters; avaricious to acquire and eager to keep." But these comments are mild, if we may be permitted to use Moliere's comedies as a mirror of the French mind, when he holds the whole medical faculty up to ridicule. While we do not deny his courage, we cannot admire his taste. Regardless of the condition of the medical art at that time, no man should attack a great profession which has always labored conscientiously in the service of humanity. The expression of such a sentiment as "a dead man is but a dead man, and of very little consequence; but professional etiquette neglected does great harm to the whole body of physicians," may have been immensely amusing to the vulgar populace, but immensely abusing to serious thinkers.

Dentistry of the twentieth century is the product of American dentists. The honor of our first dentist goes to New England, but as a consolation we may remind ourselves of the fact that the first American jury sat in Virginia and that this jury had the honor of convicting a "Doctor" (degree unknown) for horse stealing. In 1840 it became necessary for Drs. Hayden and Harris to establish the first dental school in the world when medical schools refused to include dentistry in their curriculum. For some time it was considered a great disadvantage to be thus severed. But "sweet are the uses of adversity" for the far reaching effects of this separation could not be foreseen by these pioneers. From that time the dental profession of America ceased to be held back by the parent profession and has developed as a separate entity far beyond the dentistry in those countries where the medical school has complete dominance. With the slowly revolving years we were coming back on a higher plane to an age of specialization as the age of our infancy among the early Egyptians. Dentistry had either to be rejected as a menace or accepted as a working part of the medical machine.

With the high development of the profession the desirability of hospital affiliation became apparent and dentists were appointed to hospital staffs. The harvest to be gleaned from such an association was soon indicated by the

innovation of ether anesthesia at the Massachusetts General Hospital by Morton in 1846. It is a great source of pride to note that it was in Richmond, Virginia, in 1881 that the American Medical Association met and passed a resolution creating a section on dental and oral surgery.⁵ This movement was introduced by S. D. Gross, a luminary of American surgery, and warmly supported by the illustrious Davis.

At the first meeting of this section in 1882, emphasis was laid upon the necessity of establishing chairs on dental diseases in medical schools, to be filled by practicing dentists.⁶ This resolution met the same fate as the one passed by the American Medical Association in 1887, providing for those holding the D. D. S. degree to become members.⁷ We note in passing that "many are called but few are chosen."

As early as the year 1801, Benjamin Rush reported in his brilliant conclusions the miraculous cure of "rheumatism," "dyspepsia" and other disorders, by the removal of diseased teeth, remarking "I have been made happy by discovering that I have only added to the observation of other physicians in pointing out a relation between the extraction of decayed and diseased teeth and cure of general diseases.⁸ And so it appears that the genius of Dr. Rush lent itself as readily to establishing dental reclamation in medicine as his personality lent itself to establishing Thomas Sully's reputation as a painter.

Although physicians and dentists, have builded their history from the same traditions, laws, ethics and a mutual ambition for knowledge and skill to benefit mankind, it was not until the collective influence of the foregoing observations of Rush in 1801, Riggs revolutionary paper in 1875,⁹ the report of a committee on rheumatic fever of the British Medical Association in 1889,¹⁰ and William Hunter's indictment in 1910 was assimilated, that the importance of mouth pathology in the diagnosis and treatment of disease was accredited by the medical profession. As a result, and true to man's immemorial custom, there developed within the ranks of both professions a number of faddists, the culmination of whose genius seemed in a fair way to make the twentieth century go down in history as the TOOTHLESS AGE. Arrayed against these were the ultra-conservatives whose motto seemed to be "no harm is done where no hurt

is felt." But the vast majority of both professions held fast to the steady influence of the old while reaching out for inspiration from the new.

From a clinical viewpoint the relationship between ill health and defective teeth was unquestionably demonstrated. But the belief that ill health was the result of the inefficiency of carious teeth in the process of mastication, causing indigestion, and that infectious food and the swallowing of pus was the sole factor, was not compatible with the fact that a healthy gastro-intestinal tract can usually tolerate poorly masticated food and as a rule destroy septic material when swallowed. The soil was tilled for the experiments of Rosenow, Billings and others to show the result of chronic mouth infections being distributed by metastasis to remote organs. Following thereupon, the medical parent began to turn a more tolerant eye upon the disenherited offspring. When a child begins to show intelligence a father straight-way claims it as his own. And so, as "the old order changeth," the birth-right was restored and a common interest recreated. Thus the day when dentistry was judged in terms of gold crowns and false teeth was relegated to the past, and rests in the archives with that era in medicine when calomel was king and blood-letting the anchor of hope.

At the present time hospital dental service has developed to such an amazing degree that some American hospitals require a dental staff of twenty-five persons. A report on dental needs and dental facilities prepared by the service bureau on dispensing and community relations of hospitals of the Americal Hospital Association shows that dental service is either definitely established or well under way in more than one-third of the two hundred and eighty-two general hospitals of the United States. On the basis of this survey and the studies of dental work made in connection with other surveys this report emphasizes:

1. "A dentist competent as a dental diagnostician should be recognized with adequate rank on the staff of the hospital, and should be given the necessary facilities such as access to the X-ray and to beds when necessary.

2. "The primary responsibility of the hospital in dental care is the dental diagnosis of patients whose mouth conditions are involved as a factor in the disease for which the hospital accepted these cases and for whom dental

treatment is necessary in order that the hospital medical and surgical work shall attain satisfactory results. In other words, a hospital cannot carry out adequate diagnosis and treatment without undertaking dental diagnosis and in some instances, dental treatment also.

3. "A routine dental examination of hospital cases should be included as a part of the physical examination."¹¹

In accordance with a resolution passed by the American Dental Association with regard to the development of dentistry in the hospitals of each state, the President of the Virginia State Dental Association, requested that a survey be made of the hospitals in Virginia. A letter was sent to sixty-two hospitals with the following questionnaire: "Is there a regularly appointed or permanently employed dentist on your staff? Does he examine the mouths of all patients? If so, to what extent? If not examined by a dentist, are the mouths of all patients? If so, to what extent? What is the extent of this examination?"

Of the hospitals addressed, forty-eight, or 77 per cent replied. This shows a most gratifying interest in dental service on the part of our hospitals. Fifteen hospitals, or 31.2 per cent, reported a dentist on their regular staff. Three hospitals, or 6.2 per cent, advised that they have under consideration the appointment of a staff dentist. A consultant dentist was acclaimed by seven hospitals, or 14.6 per cent. From the preceding conclusions we see that dental service is actually established or recognized as necessary in twenty-five hospitals or 52 per cent of those answering the questionnaire; this being forty per cent of those addressed in Virginia. Comparing our findings with the survey conducted among the larger general hospitals of the United States, it developed that the hospitals of Virginia, though comparatively small and frequently located in rural districts, are keeping pace with the progress of dental advancement. Encouraging as this may seem, the fact remains that in only nine hospitals, or 18.8 per cent, are the mouths of all patients examined by a dentist.

Further observation of the replies shows that in twenty-eight hospitals, or 60.4 per cent, an inspection only is made by a physician followed by a Roentgen ray examination

if deemed necessary. But little mention is made in these reports of a clinical examination or interpretation of the X-ray examination by one trained in mouth diagnosis. From our view point a professional diagnosis cannot be satisfactorily determined except by one so trained, but, of course, every question has two sides. It makes some little difference to the fly, however, which side of the "tanglefoot" he lights on.

The most surprising fact disclosed in this survey is that in this day of highly developed medical science one-fifth of the hospitals recorded apparently do not consider the mouth as a factor in disease since they report no examination at all. This deficiency has been explained by some as due to "the war," but they neglected to make clear whether they referred to the Spanish-American or the Civil War.

The ideal of our hospitals is no longer merely to put the patient back on his feet; to restore the patient to his normal self is the goal. To realize this ideal, the mouth examination is one of the elements from which the complete diagnosis is made.

"Men have found that mastery comes through limitation of field and concentration of interest and effort; coincident, however, with this increasing division of labor, provision must be made for the synthesis of results of special workers into harmonious wholes. For this integrative function, men of wide training and sympathies, with comprehensive grasp, possessing the so-called encyclopedic type of mind, will be needed more than ever before, to sift the essentials from the non-essentials, to arrange, classify and reduce to manageable volume the total results of special workers."¹² At their disposal must be "those practitioners for the eyes, those for the head, some for the teeth, others for the belly and for occult maladies."

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- 302 *Professional Building.*

CORRELATION OF DENTISTRY AND THE PRACTICE OF MEDICINE.*

By MANFRED CALL, M. D., Richmond, Va.
Dean and Professor of Clinical Medicine, Medical College of Virginia.

The opportunity to appear before an association of the dignity and importance of the Virginia State Dental Association is an honor to be coveted, and I wish to convey to you this acknowledgment of my appreciation of your invitation to read before you a paper on a subject of interest to the allied professions of Medicine and Dentistry.

It would be presumptuous for me, granting that I had the technical knowledge, to attempt to enlighten you on the fundamentals of your own profession; nor can I attempt, as a representative of the medical profession, to bring to you the consensus of opinion on the Correlation of Medical and Dental Practice. While this interdependence has been recognized, in the abstract, for some time, an appreciation of this relationship is now of increasing importance if we are to reach an approximate solution of diagnostic and therapeutic problems that concern both professions; if we are to be reciprocally helpful in developing a broader professional vision, and in acquiring a more comprehensive understanding of the present trend in medical and dental education and practice; and, finally, if we are to realize that the individual and collective efforts of the teacher, the research worker, and the practitioners of medicine and dentistry are proceeding, not in diverging lines, nor yet in parallel lines, but in lines that converge to a

common point and that represent the consummated ideal of both professions, preventive medicine and dentistry.

We can appreciably add to the impetus of this movement by a more wide-spread acceptance of the fact that the knowledge of the one profession is complementary to that of the other and by the utilization of this knowledge in a more detailed and frequent contact of the two professions at the bedside, in the clinic and in open discussions.

I will present some evidence to illustrate the present trend so far as it affects the undergraduate of both professions and in what manner specialization in effort has been the inspiration to progress in both professions. By specialization, I refer to a definite, intelligent, and sustained endeavor by one who, fundamentally grounded in the principles of his profession, preferably with a background of a well ordered and carefully analyzed general experience, has the ability, the aptitude and the enthusiasm to concentrate all of his powers, analytical and constructive, for the more complete understanding of a more or less circumscribed field of medicine or surgery.

Specialization in medicine has existed for a longer period of time than has specialization in dentistry, and this specialization has played a most important role in the extension of medical knowledge. By the operation of individual thought in the laboratory and in the clinic, by scattered observers over long periods of time, has resulted in large part the generalization and collective medical knowledge of today. From the same source we may expect the enlarged knowledge of tomorrow.

Dentistry is following the same cycle, and, like medicine, producing its practitioners, its research workers and its teachers. The last two classes, the research worker and the teacher, definitely link our two professions. The research workers in the two professions are actuated by the same desire, they have the same fundamental training and they are solving very similar problems, for they are primarily concerned in a study of the causation and prevention of disease. The teachers are primarily concerned in the dissemination of the methods adopted by the research workers and the results achieved by the practitioner in the alleviation and cure of disease.

If the practitioner, medical or dental, is to keep in touch with the advanced thought of

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his profession, if he is to give to his clientele the benefit of improved diagnostic methods and refined therapeutic procedures, he must establish some contact with the source from which this information continually flows.

My own experience in medical teaching and practice (for 22 years) has naturally led to a crystallization of opinion along this line. Not the least important of these conclusions has been a recognition,

First, of the deadening influence that follows a voluntary or involuntary professional isolation in the practice of medicine, whether in the heart of a congested city, or in the sparsely settled country districts;

Second, a corollary of the preceding, the stimulating effect of daily contact with fellow workers, and young enthusiasts, and the great benefit to be derived from a critical review of the weekly, monthly, or quarterly; summaries of the achievements of fellow workers, or an account of the origination of researches in new fields;

Third, is the necessity for a co-ordination of thought and opinion in the allied realms of general medicine and its specialties: general surgery and its specialties: dentistry and its specialties, in the light of a more illuminating physiology, pathology, bio-chemistry and pharmacology.

If we follow the present trend of the educational movement in Medicine and Dentistry, we must be impressed by the similarity of purpose and identity of expression by the leaders in these great spheres.

For example, Eycleshymer, University of Illinois, in an address on "Liberalization in Medical Education" has this to say: "In human progress there are two fundamental processes which sometimes proceed equally, but usually one or the other is dominant. . . . These two processes are extension and consolidation. In the past medicine was largely restricted to the diseases of mankind. At present she recognizes the ultimate relationship of the diseases of plants and animals to those of mankind. In the near future she must take into consideration the diseases of metals: ultimately her domain will extend over both the organic and the inorganic world. . . . In the growth of knowledge in all of its special fields and great provinces, and, a whole, the same two processes stand forth, specialization and generalization. The vitalizing factors in

these are individual thought and collective thought. Greater men in medicine must come through great liberty in medical education. The practitioner of the future, either general or special, not only must measure up in self reliance, responsibility and judgment to the practitioner of the past, but also must be better trained and more thoroughly imbued with the investigative spirit. Acuteness in observation, precision in experimentation, and caution and judgment in deduction, are the essentials for the interpretation of disease."

Now as a parallel idea the following excerpt is taken from an editorial in one of the dental journals. (*The Dental Cosmos*, Aug., 1922).

"If one were seek for the principal underlying cause of the revolutionary change that has led up to present day dental science and art. . . . the germ theory of disease should rank first in importance. From the light thrown upon the etiology of dental caries by Miller to the present day knowledge of the bacteriopathology of the oral cavity and the causal relation of mouth infection to systemic disease, the science and art of dentistry have experienced a new birth. . . . the objectives of dental practice are primarily vital rather than mechanical. The basis of dentistry is now biologic and its mechanical procedures are not ends in themselves. . . . The training of the latter day dental student must include a practical acquaintance with the broad underlying generalizations of science and the methods of reasoning by which these fundamentals have been evolved. In dental teaching there is needed a curriculum that will be educative as a whole, not merely informative."

If these educational principles are desirable for the undergraduate body, their continued application is essential for us, who have left the doors of our Alma Mater, but who are still students attempting to acquire a much desired post-graduate culture while in the service of a jealous mistress.

Both professions in this State have worthy practitioners and eminent teachers: both professions for their highest development need to produce more research workers. With vocational teachers in our state medical and dental colleges and teaching hospitals, with unlimited laboratory facilities and abundant clinical material, can we not feel reasonably assured that the day is not far distant when our undergraduate and graduate student body

will feel the call to this higher professionalism and, by their efforts, place Virginia schools and the Virginia professions in the forefront of investigative work?

The progress of dental science has been most closely watched and evaluated by your own leaders. The recognition of this progress by the medical profession was fairly sudden and coincident with the demonstration of the importance of oral sepsis.

I do not for a moment minimize the part played by our medical leaders in demonstrating the existence of oral sepsis and its relation to systemic conditions, but I would point out that the reaction of the medical mind, when it had once accepted as a possibility the importance of oral sepsis, varied somewhat, according to its professional age and to the criteria the individual had assumed as necessary to prove the efficacy of any therapeutic procedure. The practical application of this principle of oral sepsis was possible only with the aid of the dental practitioner. Frequently the combination of the two, enthusiastic disciples of new thought, let credulity run away from judgment. In this connection we remember the acceptance by many of the profession of the role allotted the amoeba in the production of pyorrhoea and the brief reign of glory enjoyed by emetine in the treatment of the condition. The sober consideration that followed the shattering of many ill-considered but optimistic prognoses and the realization that multiple foci of infection might exist tended to stabilize the medical and dental enthusiast on this engrossing subject.

The graduate of recent years, well trained in laboratory methods, in the theory of infection and immunity, is better aware of the possibility of multiple foci, other than the mouth, and also of the fact, that while foci of infection may originate and tend to perpetuate systemic disorders, yet, in many cases, secondary intoxication, metabolic rather than infectious, may assume the dominating role and perpetuate a vicious circle. It is in this type of case, for instance hypertrophic arthritis, that great disappointment has followed a failure to obtain relief after the surgical removal of one or more septic foci.

I doubt if there is any one subject on which there is such unanimity of opinion in the two professions, or any subject which has been more thoroughly discussed in all its ramifications

than the subject of oral sepsis. Aside from its manifestations as a frank sepsis, we have had our attention directed to the role it may play in the essential anemias, achylia gastrica, certain forms of insanity, various arthritides, vascular and renal degenerations, and endocrine dyscrasias. The importance of oral prophylaxis and hygiene is so well established that it does not require further mention in this particular paper.

At this time, attention may be focussed not on the teeth as such, but on the mouth and all of its structures, mucous membrane, submucosa, the osseous tissue of the maxillae, the mandible, the teeth and the alveolar structure, the blood and lymph supply, the innervation; the functional ability of the mouth structures and jaw musculature, together with a consideration of developmental anomalies, acquired defects, the effect of traumata and bad habits and the modification in function that accompanies retrogressive tissue changes in the body, however induced, and systemic states as reflected in the mouth.

This enumeration opens a field of far greater dimensions than that of oral sepsis. For the whole, obviously, is greater than any of its parts, no matter how important a fraction may be as compared to the whole. Oral sepsis is concerned with the principles of infection and immunity, with predisposing and active agents, with local and general tissue resistance. This larger field, in addition, is concerned with the findings of embryology, and the application of the principles and teachings of physiology and biochemistry. It emphasizes the interrelation of organ function to organ function as part of a general whole. It calls for as liberal a fundamental training on the part of the dentist as is now given to the medical man.

If it is essential that a physician should have some knowledge of the mouth changes that accompany Addison's disease, primary anemias, arsenic and lead poisoning, the mucous membrane changes of pellagra, purpura, scurvy, the exanthemata, syphilis, parasitic infections and various dermatoses, is it not also necessary that the dentist have an understanding knowledge of these general conditions that give such mouth manifestations?

It can be demonstrated that, even in the absence of infection, mouth conditions can produce systemic states to the point of incapacity.

city. If the early recognition of these clinical possibilities gives the opportunity for a more reasonable prophylaxis, and a less extensive pathology in consequence, should not both professions be on the alert for the early manifestations of such states? Let us illustrate this point by rickets, a deficiency disease in which faulty bone formation may occur with a resulting faulty shape of weight-bearing areas and an insufficient support of structures designed to bear appreciable stresses from the application of varying muscular forces. I venture to say that the physician would be more impressed with the resulting visible bony changes in the extremities and thorax than he would be in the possible bony changes in the head and face with their resulting effect on dentition and mastication.

Cryer in various reviews has presented a study of the developmental changes in the bones of the face and the embryonic relationship of the mucous lining of the mouth, nasal cavities and all the internal surfaces of the face, the teeth and the alveolar process. He points out that at the age of five or six years, forty-eight teeth are in various stages of transition: that with normal development the jaws are in typical relationship the one with the other, and the teeth erupt with typical alignment and occlusion and with typical arches.

With pathologic conditions subsequent to the eruption of the deciduous teeth, structural alterations and misplacement of the permanent teeth may occur with modification in the shape of the jaw, face, maxillary sinuses, and even in the nose and its accessory sinuses. Viewed in this light, rickets has a new significance and abnormal mouth mechanics loom as a potential etiologic factor in diseases of the gastro-intestinal and respiratory tracts.

Disharmony of structure must be associated with disharmony of function. As the salivary and mucous glands arise from the same embryonic tissue as the teeth and the alveolar process, perverted development of the one should leave some impress on the development and functional ability of the other. If then insalivation and mastication are important steps in the digestive cycle, any perversion of form or function may initiate a change in the whole digestive cycle.

Green recognizes this when he states that "Loss of the means of mastication may lead ultimately to partial or complete loss of func-

tion of the glands which furnish certain important digestive hormones." (Medical Diagnosis).

Lorand, in *Old Age Deferred*, speaks of its onset, even before thirty years of age as being "accompanied by loss of the teeth, the gums also are retracted from the teeth, which consequently appear greatly lengthened: later on the teeth become loosened and fall out. This then causes the jaw bone to atrophy, the face becomes sunken and the individual appears many years old. There is a tendency to constipation, nutrition is below normal," etc.

For the maintenance of any function, constant exercise of such a function is essential, and the state of the general vitality of the patient conditions the functional activity of each organ. Glands must receive their normal stimuli: the digestive glands have their chemical hormones, secretory impulses along the nerve paths as well as the physical presence of the food. Inhibition of function, even in the normal organ, may be variously induced.

The function of motility is often of greater importance than the function of secretion. Diminished motility may result in stasis; increased motility in hyperperistalsis and even spastic obstruction. With the former, abnormal fermentation or putrefactive changes may be induced, while in the latter, diarrhoea may result; in the former toxemia and malnutrition, while in the latter is the tendency to diarrhoea and asthenia. The character of the food ingested is determined to a large extent by mouth mechanics: the number of teeth, their occlusion, the sensitiveness of the gums and the periodontal tissues.

Cannon, in his "Mechanical Factors of Digestion," gives a summary of what occurs in normal mastication; postulating a normally developed bone and muscular apparatus his reference to the secondary events induced by the initiatory act are of great interest, for from it we can readily deduce that just in proportion as mastication is interfered with, whether by structural alteration or defects, or by painful phenomena associated with the act of mastication or deglutition, the whole cycle of digestion and assimilation may be unfavorably influenced.

"The freedom of movement of the lower jaw permits a wide variety of relations between the upper and lower row of teeth: they can be brought together, separated or pressed

with a sliding motion one row upon the other, either forward and backward or from side to side. The up and down motion is essential to the use of the biting front teeth: the side to side motion is more useful in the later process of chewing: the tongue and cheeks act like the hopper of a mill, and force the food between the grinding facets until it is broken up or torn into fragments of proper size for swallowing.

"The duration of mastication varies with appetite, age, the demands of business, the quantity of food in the mouth, and especially with the nature of the food, whether fluid or gummy, moist or dry, crisp or tough. The amount of mastication given any food is related to the readiness with which a mass is comminuted, insalivated and gathered into a bolus, and is not related to the degree of salivary digestion.

"The effect of the mechanical treatment in the mouth is the production of a semi-fluid mush in which there are likely to be particles of varying size, less than 2 m.m. in diameter. Such comminution must result in an enormous increase in the surface exposed to the action of the digestive enzymes and thereby promote the rapidity of their action. The secretion of saliva, which softens the hard particles in the food and with its ptyalin starts the digestion of starches, is also promoted by the movements of mastication. The pressure exerted in the process of mastication may be surprisingly great. The pressure which the molars are capable of exerting, for example, as determined by a spring dynamometer may be as high as 270 lbs. With a direct thrust the crushing point of cooked meats has been found to vary between fifteen and eighty lbs., of candies between thirty and 110 lbs. and of various kinds of nuts between fifty-five and 170 pounds.

"The voluntary act of chewing has been found to have much significance for the proper initiation of gastric digestion. During mastication substances of pleasant taste are brought in contact with the gustatory organs of the tongue and cheeks and odors released from the separated food rise to the olfactory region of the nose and, through the pleasurable sensations aroused by this stimulation, the gastric juice is reflexly started flowing in preparation for gastric digestion. As has been proved by experiments of Pawlow

and Elkins, this initial 'psychic juice' may be a prime condition for the co-ordination of gastric and intestinal digestive processes.

"Still another remote effect which may result from the chewing of agreeable food is the development in the stomach of a condition of tonic contraction, a state of sustained shortening of the circular muscles, which nicely adapts the capacity of the organ to the contents, whatever the amount swallowed. The peristalsis of the stomach, which churns the food with the gastric juice and pushes the chyme onward into the duodenum, is dependent on the tension developed in the muscular wall as a result of its tonic state. Although these secretory and motor activities of the stomach are not, as we are aware, directly subject to voluntary control, they are capable of being profoundly influenced, favorably or unfavorably, by the character of the experiences, agreeable or disagreeable, that attend the process of mastication."

Is any further evidence needed to indicate the role that mouth mechanics play in the digestive act? Deduction readily indicates the functional changes that may occur and it is a well known fact that functional disorders, perpetuated, finally resolve into true pathologic states. A similar relationship applies to the respiratory tract.

Mouth conditions, aside from oral sepsis, that induce respiratory affections, are operative chiefly in that they produce changes that mechanically impair proper ventilation of the upper air passages, induce mucous membrane changes, lower tissue resistance, conduce to infection, and result in marked irritation of the respiratory bronchial tract with subsequent pathology.

The normal protective mechanism of the lungs is so efficacious that, according to F. Muller, the contents of the alveoli and of the bronchi, even as far as the trachea, are sterile, under physiologic conditions.

That part of the protective mechanism we will consider lies in the area and arrangement of the mucous membrane of the nose. Here we find an enormous area of mucous surface in a relatively small space, due largely to the shape and formation of the turbinate bones, producing approximately one and one-half pints of secretion daily. In normal nasal breathing the air is warmed, filtered and saturated with moisture in its passage through

the nose before it enters the lungs: foreign bodies of small size, dust, soot and bacteria are entangled in the surface mucous: the current of air passing backward is deflected at an angle by the pharyngeal wall with further opportunity for the deposition of foreign particles, and it then enters the lower respiratory tract where the second part of the defensive mechanism becomes operative. Conditions, then, that lead to mouth breathing negative the first part of the protective mechanism of the lungs and thus may induce disease.

In this connection, Cryer states that abnormal deposits of lime salts may prevent the teeth from erupting into their normal positions, fixing the cancellated tissue of the alveolar arch, forcing the tongue back into the pharynx, carrying the soft palate upward and plugging the posterior nares, producing mouth breathing and blocking nasal drainage.

I have been impressed with the number of cases, even in early adult life, that present anatomic nasal changes, not the result of traumatism, and not, necessarily, the result of infection, even though accompanied by infection. I refer to distorted nasal septi, with resulting mucous membrane changes and the conditions that produce mouth breathing.

Dewey states that "the distance between the floor of the nose and the roof of the nose is dependent upon the development of the lateral wall of the nose, the principal part of which is the superior maxillary bone. If any condition arises that interferes with the growth of the superior maxillae, it necessarily will cause a shortening between the floor of the nose and the roof of the nose and the nasal septum, continuing to grow downward, as it meets with resistance from the floor of the nose, will become deflected."

This statement tends to answer the question as to whether the nasal condition is a primary one, or secondary to abnormal mouth development in a certain number of cases, and also to answer the question "Should these patients have been referred in early life to a rhinologist, a pediadontist or an orthodontist?"

The rhinologist would probably have advised a period of watchful waiting, certainly until fifteen years of age, and then, if necessary have adopted an operative rather than a prophylactic procedure. In this connection I can heartily endorse the opinion expressed by Dr. Liles before this Association at its last

meeting, "That it is a duty to be alert to diagnose and treat causes rather than symptoms and that preventive dentistry must start with the child even before the teeth are erupted."

I believe dental consultation should be a routine procedure in early life, even in children supposedly normal.

The relationship of mouth conditions to manifestations on the part of the nervous system is not so apparent, but, when we consider the innervation of the teeth and associated parts by the sensory branches of the fifth cranial nerve and note the relationship of the nuclei of the fifth nerve with those of the sixth to the twelfth cranial inclusive, as well as the ganglionic communications of the fifth nerve, we find an explanation for many of the reflex phenomena originating along some of these branches.

Conditions producing irritation along one small portion of its many branches and subdivisions give varying manifestations in the central nervous system or the organs of special sense—optic, olfactory, auditory—as well as in the gastro-intestinal and respiratory tracts. Among the causes producing such manifestations may be listed, mechanical compression of the nutrient foramina, however induced, impinging on nerve or vessels, shocks from blows upon the mandible or from an abnormal degree of concussion in mastication, chemical irritants, metabolic or bacterial toxins, unerupted or impacted teeth.

The resulting symptoms will vary with the intensity of the exciting cause and the duration of its action and will include vaso-motor, secretory and trophic, as well as painful phenomena, from the mild neuralgias to the severe neuritides.

While the areas of pain reference to the head and face have been worked out for the various teeth such as fronto-nasal, maxillary, mandibular, temporal, mental, naso-labial, and superior laryngeal, the same areas may be involved in diseases of the eye, the nose and its accessory sinuses, and certain thoracic and abdominal viscera supplied by the vagus,—especially the lungs and the stomach. A discriminating judgment and a most careful analysis of the evidence would be called for in establishing the true etiology of such manifestations.

An illustration of a trophic manifestation

from dental irritation is of interest. Le Clercq, in discussing Chronic Gingival Irritation in the etiology of Alopecia Areata, shows that in 105 of his cases it was the sole determining factor: in twenty-five per cent. it was the preponderating factor: and in sixty-five per cent. it was a more or less important factor. The alopecia was limited to the side of the dental lesion, it was characterized by a limited number of areas, generally but one, with two areas as a maximum where only one tooth was involved: it was peculiarly benign and yielded readily upon cessation of the irritation.

The evidence I have presented to stress the analogy in the fundamental training of the medical and dental student: and the points of contact chosen to illustrate the correlation of medical and dental practice could be indefinitely extended.

My own attitude is one of profound respect for the achievements of dentistry and a realization of the fact that dental diagnosis requires for its fullest development, and has produced, men as well trained for the purpose as can be found in any medical or surgical specialty. That in its therapeutic procedures, prophylactic or curative, it calls for the mechanical skill of the artisan and the imagination and perspective of the artist for accomplishment of results necessary, not only for the comfort and appearance of the patient, but for the preservation of most important body functions. And, that until such qualified dental representatives are added to the staffs of all general hospitals, or included in any group of men who offer a complete diagnostic clinic, a most essential factor is lacking in what otherwise might be a complete organization. The practical operation of such dental contact can probably be best worked out by hospital and out-patient organizations. The establishment of such a dental department and the appointment of a chief of such service, with full responsibility for the development of the department, has at once a tremendous educational value on the entire hospital staff.

In a teaching hospital, the qualifications for such a chief should closely parallel those required of the head of a surgical division, including aptitude as a teacher, interest in pedagogic affairs and research, large clinical experience, and general proficiency as a practical dentist. Such a chief should have the authority to nominate to the governing board

all associates and subordinates and should be held personally responsible for the character of their work.

In our own hospital, a private institution, a routine inspection of the mouths of all hospital cases is made by Dr. Guy Harrison, head of the Department of Oral Surgery. He indicates on a special form to be attached to each chart whether or not a complete mouth examination is indicated. The signature of the attending physician on this attached report authorizes or declines such complete examination. This procedure was adopted because many of our cases are from the city in which the institution is located, have their own dental affiliations, and might prefer to have such examination completed by men of their own choice, and at some future time.

In a general hospital, certainly on its charity wards, such a degree of ethical consideration would not as a rule be necessary for obvious reasons.

When the volume of the hospital clinic justifies the service, appointment of dental internes must be considered.

I might say, that, so far as the teaching hospitals of the City of Richmond are concerned, the Memorial and St. Philip's, we are now making a critical survey of each hospital teaching department, its organization, its teaching methods, and its functional efficiency as it pertains to the department as such and also as an integral part of the Medical College. As chairman of its Medical Staff, I feel that a sympathetic and understanding co-operation of this staff with the representatives of the dental faculty will, in the near future, result in a most satisfactory and constructive development along this line, and include in addition an opportunity for the training of the entire nursing corps in essential mouth prophylaxis.

The value of our own staff meetings has been materially enhanced by the presence of our dental confreres. Their discussion of our work, and our discussion of theirs, the exhibition and reviews of cases, has resulted in a better balanced viewpoint that would otherwise be possible, and has been of enormous informative value.

Until all patients, charity or pay, can have the benefit of such talent, and the staffs of all general hospitals are strengthened by the addition of such men, we as a profession have

failed in an obligation to the patient, the institution and ourselves.

Stuart Circle Hospital.

ETHMOIDITIS: DIAGNOSIS AND TREATMENT.*

By ELBYRNE G. GILL, M. D., Roanoke, Virginia.

Medicine arose out of the primal sympathy of man with man; out of the desire to help those in sorrow, need and sickness. This knowledge must have been brought very strongly to the attention of the Program Committee when they selected this subject for the symposium, for one has to be in practice only a short time to realize that the problem of "Ethmoiditis" is one of the most perplexing and oft times disappointing in the whole category of our specialty.

Before entering into a discussion of the subject, the anatomy of the ethmoidal labyrinth will be briefly reviewed. These cells are present at birth, being hollowed out in the foetus at the third embryonal month and develop simultaneously with the frontal sinns. The latter is but an offshoot from the ethmoid, which forces its way into the diploe of the nasal portion of the frontal bone. Curran has proven that all of the cells are present at birth as well as those which afterward go to form the sphenoid.

The ethmoid labyrinth embraces all that portion lying between the two lateral plates of the orbit. It is composed of two capsules, with a partition between; normally, the cells of the ethmoid labyrinth are contained within the limits of the ethmoidal capsule but, under certain circumstances, they may extend far beyond these boundaries into the frontal, maxillary and sphenoid bones.

We are now brought face to face with the problem of diagnosis. When a patient presents himself (A) for examination with the history of sneezing, loss of sense of smell, dull headache, mouth breathing and bronchial asthma, and a rhinoscopic examination reveals the presence of a nares filled with polyps, the diagnosis is apparent even to the most superficial observer. The treatment is obvious. This type of case is frequently encountered and the results from surgical treatment are universally good when a complete operation has been performed. By a complete operation is meant a

thorough removal of all ethmoidal cells (anterior and posterior).

Now another patient (B) presents himself for examination, giving the history of having a post-nasal discharge particularly annoying in the morning on account of the glue-like secretions which accumulates in the throat and naso-pharynx. Are we dealing with a discharging ethmoid, sphenoid, or maxillary sinus? How can we convince ourselves the ethmoid is the offending sinus? Needle puncture will reveal the contents of the antrum. What a joy and relief it would be to all rhinologists if the sphenoid could be eliminated as readily. We are told that a cotton-tipped applicator introduced into the opening of the sphenoid will disclose the nature of its contained secretions. This statement is easily made but difficult to substantiate.

For making a differential diagnosis, Skillern suggested the following technique: "Introduce a small quantity of powdered methylene blue on a cotton pledget into the sphenoid after thorough cleansing and drying. Into the maxillary sinus, it can be insufflated through a Lichtwitz needle. The patient is instructed not to blow the nose or clear the throat as far as possible until next morning. Then use a large cloth or towel. Comparison of the masses of blown or hawked out secretions will at once show the amount that is tinged with blue and that which is clear of coloring matter, thus giving one reliable data from which to draw a conclusion. If it is shown that the mucosa of the sphenoid or maxillary is secreting a considerable amount, a differential diagnosis between these two can be made by alternating the application of the methylene blue between them." This suggestion is worthy of careful and thorough trial as the sphenoid is a stumbling block to all of us when called upon to say whether it is diseased or not. Even when we have the assistance of a skilled roentgenologist.

After weeks and sometimes months of careful and painstaking treatment of these cases (which usually are patients of prominence), we find that the annoying post-nasal discharge continues. We have satisfied ourselves that the sphenoid, maxillary and frontal are not diseased. What is our next procedure?

We are now presuming that all palliative measures have been exhausted. Should we advise operation on the sinus? This question

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can best be answered by individualizing every case. What is best for one patient will not always apply to another. Age, temperament, vocation, all have to be considered. In case an operation is performed, conservation should be the "guiding star." It is better to do too little at first and if necessary do a secondary operation, for if too much is done at first the opportunity may not be given for the second operation.

In the writer's opinion, the operative procedure required for this type of case is a correction of any existing septal deformity and a middle turbinectomy. This will provide ventilation and drainage. We should begin anew our palliative treatments; namely, daily irrigations with saline solutions and suction. If this procedure does not effect a cure after a reasonable time, it is doubtful whether further operative procedure would be justifiable. Vaccine therapy in my hands has been a disappointment and its use has been discontinued.

Having briefly discussed hypothetical cases A and B, let us turn our attention to hypothetical case C, who presents himself for an examination of nose and accessory sinuses at the instance of an ophthalmologist. The patient hasn't any subjective symptoms referable to the nasal sinuses such as existed in cases A and B, but has optic neuritis or some other kindred lesion and the nasal sinuses are suspected as being the etiological factor. The rhinologist is asked to state if the sinuses are the sources of the infection. Rhinoscopic examination reveals a deviated septum which wedges the middle turbinate firmly between the ethmoidal labyrinth and sphenoid. Examination otherwise negative. Shall we report negative nasal findings because pus was not evident and the X-rays negative?

Stark answers this as follows: "From a nasal standpoint we must not expect to find the common symptoms of sinus infection, pus polyps, history of nasal discharge, etc., as we are dealing with a closed sinus; otherwise, we should not have pressure. The deflected septum and middle turbinate tightly pressed against the lateral wall should always be suspected." How shall we now proceed? Advise immediate operation or a more careful search for other foci of infection? Beck says: "I often wonder if in some of these cases it would not be wiser to operate immediately and then

take a Wassermann or other diagnostic measures, because while waiting to make a diagnosis by exclusion the nerve may be irreparably damaged by the swelling. It will be admitted that a latent lues may exist in a non-luetic sinus disease, and many a so-called toxic amblyopia has been treated by withholding tobacco and alcohol and has gone blind while the sinus disease was not taken into consideration, because there was no pus in the nose or the X-ray was negative."

The appropriate treatment would be as in the former case, a submucous resection and a removal of the middle turbinate, as ventilation and aeration will have been established. This statement is well illustrated by the report of the following case, taken from my records:

CASE REPORT: R. G. C., age 35, consulted me November 21, 1920. Occupation, farmer. Gave the following history: Twelve years ago right eye became blind (has been this way ever since). Onset sudden, without any apparent cause. Three years ago left eye became partially blind. Had to give up his work as clerk. Condition remained this way for about six months. Under treatment vision improved to such an extent that he resumed his duties as a clerk. For past three months vision in left eye has been failing rapidly and now only sees fingers at close range. Results of my examination are as follows:

Vision O. U.—Form at close range.

Vision O. D.—Total blindness.

Vision O. S.—Form.

External Examination—O. S. Pupils react to light and accommodation. Cornea, heavy deposits on Descemet's membrane. Tension normal.

Fundus Examination—O. D. Rupture of choroid and retinae in macula region. O. S. Numerous and heavy vitreous opacities. Impossible to see nerve head.

Sinuses—All clear to transillumination.

Nose—Septum deviated to left side coming in contact with middle turbinate. No pus or secretion of any kind present.

Throat—Tonsils cleanly removed.

Ears—O. K. Stereoscopic X-ray plates reveal cells of ethmoid and sphenoid perfectly clear.

This patient has been through the hands of three competent ophthalmologists who had made careful and painstaking search for some

foci of infection. Every test, including Wassermann, was negative. Tonsils had been removed, along with several teeth, with the hope of finding the source of infection, but the vision continued to fail. In spite of the negative X-ray findings of the sinuses and the absence of pus in the nose, I advised opening the ethmoidal labyrinth and the patient like "The drowning man" readily consented. On November 22, 1920, I performed a submucous resection. Middle turbinectomy and opened the ethmoidal labyrinth. Mucoid material was present but no pus. No attempt was made to curette all of the ethmoid cells as ventilation drainage had been established. Also we felt that it was almost a physical impossibility to remove all of the cells as we may cause a spread of the infection or exaggerate it by leaving a mass of macerated tissue. The progressive improvement of the patient's vision reveals the wisdom of the position taken. The patient left the hospital November 25, 1920, and returned to his home in the country. Only medication was iodid pat and nasal spray. On January 15, 1921, (two months after operation), patient's vision was greatly improved. This improvement continued until he returned to my office, May 20, 1921. Vision O. D. Nil. O. S. 20/20-2. Fundus O. D. Same. O. S. Vitreous clear. No opacities.

I mentioned this case for two reasons: first, to show the seriousness of a latent infection of the ethmoidal sinuses, and secondly, what may be accomplished by simply establishing ventilation drainage through removal of the middle turbinate and the correction of the septal deformity.

This patient was seen again September 15, 1922; condition was the same, vision O. S. 20/20-2.

We have touched upon the three types of chronic ethmoiditis which we encounter in our daily routine. No effort has been made to present any one in all of its phases as space and time will not permit, and furthermore it is not so much my desire to present my views as it is to elicit a full discussion from the members of the Society.

There is another type, Acute Suppurative Ethmoiditis, which has not been mentioned. When a patient presents himself for examination giving the history of severe sub-frontal headache, worse in the mornings, nasal discharge, following "cold," one immediately thinks of sinus involvement. Again we are

called upon to say whether we are dealing with a maxillary, frontal or ethmoid. Needle puncture will eliminate or condemn the antrum. A differentiation between frontal sinus empyema and suppuration of the anterior ethmoidal cells is more or less of a rhinological nicety. It is now generally conceded that when frontal sinus cells are involved the ethmoid cells are similarly affected. Since the therapy in both instances is practically the same (daily saline irrigations and suction), further consideration will be useless. If these cases are treated at the onset, fully ninety per cent. will clear up under the above mentioned treatment. In the few cases that do not respond to this mode of therapy, operative interference will be required. All that is necessary in most cases is a fracture of the middle turbinate which provides drainage with the aid of suction.

In the presence of acute suppuration, one should do as little surgical work as possible. A sub-mucous resection, turbinectomy and ethmoidal exenteration is only indicated when there is an invasion of the orbital tissue by the infectious process or symptoms of impending intracranial involvement.

From my brief remarks on this all important subject, one may infer that I shun too readily major surgery on the ethmoid. It is not the major surgery I shun but the major failures it entails. No less an authority than Skillern says, "Operative procedures upon the ethmoid, unless slowly, carefully and systematically carried out, are most apt to spell disappointment, and radical operations upon this structure do not by any means end in radical cures."

CONCLUSIONS.

1. Complete exenteration of ethmoidal cells in cases B and C should be the court of last resort.

2. If we will spend as much time and patience treating these cases before operation as we do following the operation, fewer would be necessary, as there is no part of the human anatomy which possesses more recuperative powers than does the nose and its accessory sinuses.

3. Before any operation is done, one should always study carefully stereoscopic X-ray plates of the affected parts. Bacteriological examination of the secretions or pus should be made.

4. If by the presentation of this subject we

will have learned to respect the "virginity" of the ethmoidal labyrinth. it will not have been in vain.

612 MacBain Building.

ETHMOIDITIS.*

By W. L. MASON, M. D., Richmond, Va.

In reviewing the literature upon this subject one finds very little written in the past few years on ethmoiditis alone, except as it occurs in children. Much work, however, has been done upon it in conjunction with other accessory sinuses in relation to eye disturbances, and it is possibly this phase of it that is being most actively studied today. We already hear criticisms of the unwarranted opening of accessory sinuses in cases of lowered vision due to some cranial condition or undiscovered foci of infection. Thus it behooves us to give these cases particular study, using every means at our disposal to arrive at an accurate diagnosis.

In considering ethmoiditis, it is important to bear in mind the anatomical position of the ethmoid, its relation and proximity to other sinuses, and, when we do, we are at once confronted with the fact that it is almost a matter of impossibility to have an ethmoiditis without some inflammation or suppuration in the adjoining sinus or sinuses. The ethmoid is really more a part of the nose. The inhaled air comes more in contact with it, is warmed and moistened more by it; hence, it is hard to conceive of even an acute coryza without involvement of the ethmoid. In fact, I believe that in every acute catarrhal process of the nasal mucosa all sinuses are more or less involved, because of continuity. Consequently, an ethmoiditis cannot be diagnosed by simply looking up the nose and finding pus, nor can it be said to be clear if not seen. We are all well aware of the fact that the easiest ethmoid condition to diagnose is frequently the hardest to treat.

Involvements of the ethmoid may be acute or chronic, which in turn may be either suppurative or non-suppurative. Skillern, in his book on accessory sinuses of the nose gives the following classification:

1. Acute Catarrhal Inflammation.
2. Acute Suppurative Inflammation.
3. Chronic Catarrhal Inflammation, or Hyperplastic Ethmoiditis.

4. Chronic Suppurative Inflammation.

5. Chronic Catarrhal Inflammation with Suppuration.

I. *Acute Catarrhal Inflammation* occurs more or less with every acute coryza, depending upon the severity of the attack. The mucosa of the uncinat process, bulla and external surface of turbinates become swollen, having the appearance of a myxomatous degeneration with punctiform hemorrhages. The interior of the cells shares in these changes and resolution occurs more slowly than in the general nasal mucosa. This condition may be the result of irritation alone.

II. *Acute Purulent Inflammation* is unusually associated with acute frontal sinus empyema; if arising idiopathically, it may be traced to one of the infectious diseases. Resolution occurs more readily than in other sinuses on account of the relatively good drainage of each cell, together with the action of the cilia. In this form of ethmoiditis the mucous membrane is deep red and covered with thick purulent secretion and is directly due to micro-organismal invasion. In general, it may be compared to a particularly severe cold in the head.

In absolute occlusion of the nares, headache is constant with occasional neuralgic outshoots toward the deeper structures of the eyes. Ocular symptoms are prominent, such as pain on rotating, epiphora, orbital neuralgia on reading or otherwise concentrating the gaze. Anosmia is marked as long as nasal obstruction exists. Each attack predisposes toward another, leaving the disintegration of the mucosa more marked until a condition of chronicity develops, together with a marked tendency toward catching cold. Therefore, it is wise during the interim between attacks to make a comprehensive examination of this region with the view of ascertaining and correcting the cause.

III. *Chronic Catarrhal Inflammation, or Hyperplastic Ethmoiditis* is a result more of protracted disturbance in the nutrition of the ethmoid capsule than of inflammatory changes with bacterial invasion. Mechanical causes would seem to be pre-eminent. Continual slight irritation of a certain portion of the mucosa causes at first hyperaemia with subsequent out-flowing of serum into the interstitial spaces of the connective tissue. If the irritation be mild, the hypertrophy will tend to spread itself over a broad area, gradually los-

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ing its polypoid character. If, however, it be great, the continual collection of serous elements, assisted by gravity, will soon cause the appearance of a true mucous polyp.

In the early stages of hyperplastic ethmoiditis, a condition resembling chronic coryza predominates; later on in the disease, headache above and below the eyes, radiating towards the temples, is a predominating symptom. The exudate is of a thin watery consistency, assuming a purulent character during attacks of acute coryza.

The most common bronchial affection is asthma, while granular hyperplastic pharyngitis as well as eustachian catarrh may be classed as concomitant affections.

IV. *Chronic Suppurative Inflammation* occurs in two forms: (1) open or manifest empyema: (2) closed in on latent empyema. In the first instance the purulent secretions forming in the cells escape through the ostia and appear in the nose, while in the latent variety some occlusion prevents the pus from escaping, so that it gradually is secreted under pressure until it bursts or is evacuated by artificial means.

Suppuration in the ethmoid cells usually is an accompaniment of empyema in one of the larger cavities. Acute infectious diseases seem to exert a peculiar influence toward ethmoidal suppuration. The condition is invariably due to bacterial invasion of the secretions and is distinctly purulent with a tendency to drying and forming crista not only in the nares but in the pharynx and even the larynx. The headache in these cases, when free drainage exists, is frequently nil, while in the closed in variety it is sometimes unbearable, occurring over the root of the nose and directly on the vertex. Deep seated pain in the eyes is not present unless stagnation and pressure occur.

V. *Chronic Catarrhal Inflammation with Suppuration.* This classification has found considerable opposition, most observers contending that the suppuration precedes and does not follow polypoid hypertrophies. It has been an old and accepted view that the constant drainage of purulent secretions over a given area of nasal mucosa gives rise to polyposis, and therefore these hyperplastic structures are the results of secondary irritation due to the outflow of secretion; while occasional dissent was made, it was not until Uffenorde states that the suppuration was more

often secondary to the polyposis that interest was given this thought. He re-assures us as follows: From repeated attacks of simple catarrh numerous polyps made their appearance until a greater portion of the nasal chamber was occluded, and the possibility of cleansing was so seriously interfered with that the continually forming secretions became stagnated between the polyps, putrefaction followed, and infection resulted, particularly during an attack of acute coryza. It might be added that most writers do not accept Uffenorde's view in entirety, but believe nasal polyps, under certain circumstances, result entirely from the irritation of the purulent secretions exuded from diseased sinuses.

REPORT OF CASE OF ETHMOID ABSCESS WITH RUPTURE INTO ORBIT.

Colored male, age 30, seen in October of 1921. Past history with reference to any sinus or eye trouble negative. There was marked displacement of eye forward and to the right. Pupil dilated and vision reduced to light perception. Movements of eye-ball extremely limited. Conjunctiva markedly swollen. Nerve atrophied. Through upper lid to inner side was a small sinus which discharged an almost constant drip of thick creamy yellow pus. Examination of nose in that side showed mucous membrane so much swollen that chamber was entirely blocked to respiration. Patient stated that trouble followed an attack of grippe, through which he suffered terrific headache and did not send for doctor until eye began to bulge and pain became unbearable.

I removed a portion of mid-turbinate the day he was brought in, establishing drainage by nasal route. One week later swelling of interior of nose was much reduced and eye had receded. At this time, I enlarged opening into ethmoid and cleaned out considerable thick cheesy substance. Small curved probe passed through opening in lid could be seen in nose. Ethmoid cavity was swabbed daily with two per cent iodine in glycerine solution and, at end of three weeks, discharge through lid was only intermittent, and at end of six weeks had stopped and opening closed. The eye on the affected side is blind due to atrophy of nerve and, while mucous membrane of nose at the end of two months was still somewhat thick, there was no excessive amount of drainage and sense of smell very little affected.

Stuart Circle Hospital.

A CASE OF COMPLETE HETEROTAXIA WITH ELECTROCARDIOGRAPHIC AND X-RAY STUDIES.*

By W. E. KILLINGER, A. B., M. D., Victoria, Va.

In reviewing the literature on the transposition of the viscera, we find that the cases are classified into four groups depending on the character and the amount of transposition.

GROUP 1.—Complete heterotaxia in which all the organs are transposed. This misplacement is more frequently found than any of the conditions mentioned in the following groups. It is not necessarily associated with any defective organ, or any symptoms referable to the changed position. The five cases recently reported by Willius, had no complaint traceable to the abnormality.

GROUP 2.—Dextrocardia; or incomplete heterotaxia, in which the heart alone is transposed.

By recalling the embryological development of the heart, we can readily understand how transposition of this organ occurs. The two primitive cardiac tubes fuse into one about the fifteenth day, and auricular, ventricular, and bulbar subdivisions become evident. The tube soon becomes bent on itself which determines largely the axis of the heart. In congenital dextrocardia the tube bends in the opposite way instead of the normal S manner. Abbott explains this position by assuming that the embryo lies in an abnormal position within the chorion, so that its right side instead of its left side lies closer to the blood supply. Dextrocardia with the other organs normally placed is a relatively rare condition and, while the heart may be perfectly developed itself, according to Parsons and Smith the resulting disability may be serious. The liver and right lung impede the cardiac movements and hence result in incompetence. Smith state that patients with this anomaly are likely to complain of pain both locally and referred, which is the result of pressure on the intercostal nerve, the vagus, or its intercardiac endings. Later, there is a tendency for dyspnea and faintness to appear.

GROUP 3.—Incomplete heterotaxia in which all the organs except the heart are transposed.

This condition is very rare or, perhaps better, the condition is rarely recognized, as we do not have a displaced heart to lead us to

suspect transposition of the other organs. One case has been reported in recent literature by Royer and Wilson. However, the normally placed heart in their case showed transposition of the auricles, a rudimentary left ventricle, and a patent foramen ovale. The patient died at the end of six years.

GROUP 4.—Heterotaxia, complete or incomplete, with or without cardiac misplacement, associated with various congenital lesions of the heart and great vessels.

A good example of this is the case reported by Nanages in the *Anatomical Record* for 1920-21. In this case the patient only lived four days. There were only three cardiac chambers, the right and left auricles, and a considerably enlarged ventricle. What should have been considered the trunk of the pulmonary artery with its prominent anterior position and left upward course, was really the ascending group of the aorta with its wide communication to the single ventricle. The real pulmonary artery was poorly developed and found on the left anterior side of the aortic trunk, and apparently continuous with the base of the ventricle. We find many cases of mono-ventricular hearts reported, especially among the Philippino babies, in whom it apparently is not so very rare.

The case of complete heterotaxia reported in this paper belongs to the first group mentioned and came under my observation while making an electrocardiographic study.

REPORT OF CASE.

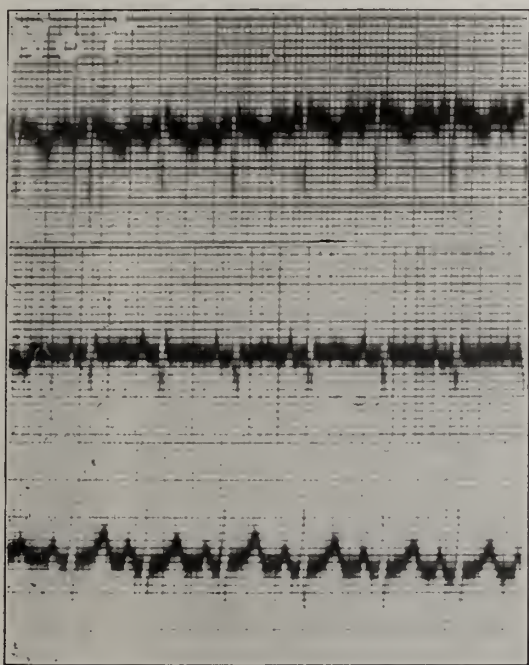
Female, white, age 14, referred to Kendig Hospital Clinic by Dr. W. J. Ozlin, for electrocardiographic examination. Family history revealed nothing important, she being one of six healthy children. She was a full time baby, normal delivery. Had measles, mumps and chicken-pox in infancy; since then has been in good health until one year ago when she began to suffer with a slight shortness of breath, and a persistent cough. Has lost some weight in past year.

She is slightly under-nourished, skin and mucous membranes good color, no cyanosis nor oedema, slight acne over back. Head of normal contour, and no tenderness over the sinuses or mastoids. Eyes and nose negative. Teeth in poor condition, tonsils cryptic, and injected. Neck is rather long but showed nothing of note. The chest was normal in contour, rather marked supraclavicular retraction,

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equal in expansion. The lungs were negative to palpation and percussion, but a few rales were audible over the hilus of the left lung, posteriorly.

At rest the cardiac impulse was not visible, but after a little exercise the apex beat was clearly visible in the fifth interspace on the right side. By palpation and percussion the apex was definitely located in the fifth right interspace two c.m. outside the mid-clavicular line. The left border of the heart corresponded to the left border of the sternum. In the fourth interspace the right border of cardiac dullness was ten c.m. to the right of the sternum. A slight systolic murmur was heard over the apex; the other sounds were of normal quality.



Complete inversion of all deflections in Lead I. Simple tachycardia. Occasional ventricular premature contraction not shown in this plate.

Examination of the abdomen revealed the hepatic sign on the left side. The spleen could not be palpated, nor splenic dullness definitely made out. However, as we know, this is a difficult task in a normal subject, unless there is an enlarged spleen.

The extremities and reflexes were negative.

Blood and urine examinations showed nothing abnormal.

Roentgenograms of the chest revealed a clear cut dextrocardia. The barium meal showed the stomach on the right, with the pylorus

pointing toward the left, also the shaded area of the liver to the left, with the sigmoid colon on the right.

Electrocardiographic studies revealed a complete inversion of all the waves in lead I, a simple tachycardia, and an occasional ventricular premature contraction.

The child has always been right handed.

COMMENT.

Transposition of the viscera is reported much more frequently now than formerly. This is not necessarily due to a more careful physical examination, but rather to the extensive use of the X-ray and electrocardiograph in examination. Where formerly the cases were found by the pathologist and the anatomist, now they are recognized by the clinician. Again due to life insurance, and public health examinations, many more people are examined by the physician than a few years ago.

The complete types of heterotaxy are not easily overlooked, it is the incomplete types that are apt to escape our recognition. In both types dextrocardia is almost the rule, and its discovery directs attention to the possibility of transposition of the abdominal organs, as was the experience in the case reported. Congenital misplacement of the heart is rare compared to acquired displacement, and the X-ray and electrocardiograph must be used to diagnose correctly. The most frequent cause for an acquired displacement of the heart is gross lesions in the respiratory tract, and these can usually be demonstrated. Schussler reports a case of acquired dextrocardia in a girl eleven years old. When the girl was two years old she contracted a severe pleural pneumonia, which was followed by extensive pleuritic adhesions in the right thoracic cavity. The heart was pulled over by these tough adhesions. And in the case reported by Carnot and Friedel, the acquired dextrocardia was due to the presence of a megacolon, which also displaced the liver and spleen.

Transposition of the abdominal viscera alone offers much difficulty without the aid of the X-ray. The left sided liver may be mistaken for a splenic enlargement, such as occurs in leukemia, Banti's disease, and other pathological conditions. In fact, Nadger reports a case in the *Indian Journal of Medicine*, that was treated for some time as a case of Banti's disease, until it was found that the left-sided mass felt was not the spleen, but the liver.

Again, Tanner reports a case in the *Long Island Medical Journal*, that was operated for a left salpingitis, and revealed a transposed viscera with a gangrenous appendix.

Labdeau, the French internist, suggests that these cases of transposition of the abdominal organs are not so rare as generally supposed. Their causes are not so easily explained as a simple dextrocardia. In the embryo the two gastric curves are situated on the same vertical medial plain and the two halves of the stomach are arranged symmetrically. Later the stomach is twisted in a manner so that its posterior border, the larger curvature, becomes convex and bulges toward the left, while the anterior border is concave and is turned to the right. This torsion causes the right part of the small intestine to be carried to the right. The various parts of the mesentery which attach the various segments of the intestinal tract to the vertebral column are more or less elongated. This explains the inversion of those portions of the intestinal tract that arise from the entoderm. The adnexa organs of the entodermic tube, the lungs, larynx, and trachea, the liver, and pancreas, are also changed; this would explain the sinistral position of the liver. In these cases the right lung has two lobes while the left has three.

With the introduction of the electrocardiograph, studies on congenital and acquired dextrocardia were begun. In 1911 Nicholai reported two cases of congenital dextrocardia in which the electrocardiogram showed a complete inversion of all the waves in lead I. Hoke reported the same findings a little later. Owen in 1912 reported a case of complete transposition of the viscera with the electrocardiographic studies made by Lewis, who states that the cardiograph offers a ready and certain method of diagnosing transposition of the heart.

If in the normal subject we take lead I from the left arm to the right arm, instead of from the right to the left as we usually do, an inverted picture will be obtained similar to that found in dextrocardia. This inverted picture applies to lead I alone, according to Lewis, because it is the only symmetrical lead. Acquired dextrocardia never gives the completely inverted electrocardiograms found in congenital dextrocardia.

Willius reports cardiographic studies in three patients in whom transposition was present. In the first patient there was complete

inversion of lead I and II. In the second and third patients there was inversion only in lead I. He explains that the inversion of lead II in the first case was due to the exaggerated inclination of the heart to the right. Willius states that inversion of the deflection in lead I is definite evidence of congenital dextrocardia, and that his experience confirms the value of the electrocardiogram in the differential diagnosis of cardiac displacement.

Calvin Smith reports a case in which the long axis of the heart pointed toward the right side, and yet the electrocardiograms were normal. In this case, however, the dextrocardia was the result of dextroversion rather than inversion of the heart due to abnormal embryonical development. The striking differences in the electrocardiographic studies of congenital dextrocardia are easily understood when it is remembered that there exist two forms of this condition. In the one form the heart is not transposed, but rotated on its vertical axis, from left to right, as a result of a persistence of the embryonic stage, in which the apex was formed by the right half of the common ventricle. In this form the cardiograph shows no inversion of the waves in lead I. In the second one, represented by my case, transposition mirror picture rather than rotation is present.

It is in this form that the electrocardiogram shows inversion of all the waves in lead I. So we must conclude that the electrocardiogram affords the best method of differentiating the acquired displacement from the congenital misplacement, as well as the two types of dextrocardia from each other, while, of course, the X-ray gives a clear-cut picture of the abdominal organs.

THE PHYSICIAN AND THE QUACK.*

By J. E. RAWLS, A. B., M. D., F. A. C. S., Suffolk, Va.
Senior Surgeon to Lakeview Hospital.

Perhaps there are some present who would think that an apology would be in order to read a paper entitled "The Physician and the Quack," but not so. The subject of "the true orthodox physician and quackery" has not only interested each member and the medical societies of our profession, but the public at large. This relation or concern that exists between the Physician and Quack on the one side, and the laity or the public on the other, engendered

*Read before the Southside Virginia Medical Association at its meeting in Norfolk, June 13, 1922.

the paper's caption and the comments therein.

Members of the profession and the medical associations have been concerned greatly, and especially of late, as to the rapid spread of quackism. The remedy for this evil has been earnestly sought and at times apparently found, but so far the remedy or medicine has not had the desired effect, as the pandemic of quackery continues to spread. So we would like to take up this subject for a few moments under the following heads:

- 1st. The Physician and the Public as it is.
- 2nd. The Quack and the Public as it is.
- 3rd. The Physician and the Public as it should be.—The Remedy.

THE PHYSICIAN AND THE PUBLIC AS IT IS.

1st. The Physician is looked upon by the public as in the profession primarily for a livelihood, regardless of the arguments to the contrary. Verbal argument does not change the public mind.

2nd. The Physician is looked upon by the laity as a person to cure the sick, and the physician, as a rule by silence or otherwise, encourages this primarily, and his friends ignorantly advertise him as such, and his worth is in proportion to the number of his supposed cures.

3rd. The Physician is looked upon by the public for obvious reasons as a competitor with his brother physician, and with the quack.

THE QUACK AND THE PUBLIC AS IT IS.

1st. The Quack is looked upon by the public as in his profession primarily for a livelihood—regardless of the argument to the contrary. Verbal argument does not change the public mind.

2nd. The Quack is looked upon by the laity as a person to cure the sick. He encourages this by word and act, and his friends ignorantly advertise him as such, and his worth is in proportion to the number of his supposed cures.

3rd. The Quack is looked upon by the public as a competitor with his brother quack, and with the true physician.

If the foregoing be true, then the public so far has seen no difference between the physician and the quack. Then the question would naturally arise, why should the public not license and patronize the quack and call him doctor. And the public does all three, regardless of legislature and law. Why? Because of an improper relation between the Public and

our Profession. This brings us to our third heading:

THE PHYSICIAN AND THE PUBLIC AS IT SHOULD BE. THE REMEDY.

The true relation of Physician and Public can only be brought about by a process of proper education, that we may know each other better.

1st. The Profession should be properly educated.

2nd. The Public should be properly educated. The physician should be better educated in the way of diagnosis. He should not only be able to recognize diseases of a definite visible or macroscopic pathology, but also diseases of an invisible, microscopic or psychopathic pathology.

We, as a profession, have become accustomed, since John Hunter's time, to think of diseases in terms of definite gross pathology. Symptoms without a definite gross pathology existed above the eyes of the patient. We diagnose such symptoms as essential, idiopathic, pseudobilious, neurotic, "hipped," hysterical, hypochondriac and the like. These terms are used in the presence of the patient with an air of wisdom, but in reality are dump heaps of professional laziness or ignorance.

Such a diagnosis, as nervousness, "hipped" and hysteria, feeds the quack, and we find that he is growing fat at our expense and humiliation. The physician usually loses interest after thoroughly examining a patient, when he is unable to find any definite pathology to account for the symptoms. This loss of interest is quickly observed by the patient and the patient begins to lose interest in the doctor. Finally, the patient asks the doctor what is his or her trouble. In reply he with a Solomonic air uses a few technical terms and ends by saying "nervousness or hysteria." These terms mean to the patient that the doctor's interpretation of her trouble is imaginary—she is faking. What happens? "The parting of the ways." In a few days she consults the quack. The physician sent him a patient. The quack through mental suggestion or otherwise relieves the patient of her symptoms. The patient is grateful and tells her friends: in a short while the quack's office and pockets are filled, and then we as a profession get busy with our legislature and medical societies in an attempt to prevent the influx of patients to the quack,—but still they go.

We are glad to see some of our profession, in the form of the psychiatrist, recognizing diseased entities without a definite gross pathology, and cures or relief brought about without grease and pills. In recent months we have seen quite a number of articles in medical journals and some books written on "Psychanalysis," which is a sign that the profession is beginning to recognize diseases not based on gross pathology.

Psychopathology is a specialty within itself. We cannot all become experts in this line, but we should recognize psychopathic patients and, if unable to relieve them, they should be referred to some reputable expert. In this way the charlatan will be robbed of his gold and silver, and the patient and public will rise to a higher level of knowledge and respect as to the real worth and mission of our profession.

Our profession in a general way should become acquainted with the vices and virtues (if there be any) of the various popular methods used by the various charlatans or quacks. We cannot meet their supposed cures and popularity by negation. The public will not swallow negatives, abuses and prosecutions. We can only meet this by a knowledge of what the quack can do and cannot do. *The way to conquer evil is by fairness and by the truth.* To do this, we, as a profession, must be in possession of the facts, and the public must come to know these facts or truths either directly or indirectly.

The profession must conquer patent medicine by a similar process—by a process of truth and not by the method of negation. Our profession should become acquainted with the ingredients of patent medicine formulae and their therapeutic value, and give this information to the public either directly or indirectly, as occasion demands. Treat the virtues and vices of the patent medicines with absolute fairness, and this will appeal to the public, and will not appeal to the patent medicine man. *Truth throws on light, and light banishes the halo of mystery that shrouds the average patent medicine formula.* The quack and patent medicine man do not want us to use the method of truth and fairness, but want us to use the method of negation, abuse and threats. *Why? Because the process of truth turns on light and dries him up, while the negative and abusive method advertises him, and darkness prevails and he grows fat.*

One of the greatest paying advertisements for the quack is the average physician. We discount and abuse him to the public with negations. Just what the quacks want—it pays. Allow the most insignificant, unknown, incapable physician in a city to get in a controversy with and be abused by one of the leading and most competent physicians of that city and it would immediately bring him into the lime-light—would give him prominence. This method of quack advertisement, we, as a profession, should wisely avoid.

We have considered some of the information the profession should know. Now we will consider some knowledge the public should know.

The public should know the true mission of our profession.

They should know the true mission of the physician is an educator and not a pill-roller. The mission of the physician is to educate patient and public as to the laws governing physical health and happiness. The old proverb "an ounce of prevention is worth a pound of cure" should be reinterpreted in its true significance. The laity should look upon the physician as a consultant, as an advisor and a friend and a father against diseases, rather than mysterious and all-wise person to cure diseases. The first attitude strikes at the very cause while the latter strikes at the effect. The first is more effective and this is where we should spend our time and the public should know it.

The charlatans or quacks do not spend their energy in the human prevention of diseases but are only known by their so-called cures and fees.

The subject of cure has always been more or less shrouded in mystery so far as the public is concerned, and our profession has done very little toward clarifying or unveiling this mystery. As a result, the public's estimate of the real value of a "doctor," whether a true physician or quack, is in proportion to the number of so-called cures. The quack takes advantage of this in his advertisements, and we fear that many of our profession are stained with the same vain-glory.

The public should know that a great number of diseases are self limited and that they terminate of their own accord, regardless of physician or medicine. They should be taught that such diseases as measles, and the like, run a definite course, and terminate at a definite time, whether at such a time paregoric or dish-

water is given, or whether it is administered by Dr. A or Dr. B.

This false idea as to the cure of diseases has given us many remedies in the profession, and has not stopped here, but has fattened the patent medicine man.

The true doctor should teach the patient and public that the true physician's mission is primarily to prevent diseases, and then to pilot the patient through the storms of his disease, giving aid in the way of medicine as indicated until its course has terminated. The public should know that there is no "typhoid medicine," no "pneumonia medicine" and the like. They should know that specifics are few in number.

We must cease to mystify the medical art. Mysticism has served its purpose. It has made many of us appear wise when we were mostly otherwise. It has done more. Through this mystery and ignorance on the part of the public, quacks and patent medicines have sprung up and flourished.

Let us turn on the light of truth, and quackery and its remedies will gradually shrink. Let the public know that we, as a profession are broadminded, and possess, or are willing to possess, all known truth, so far as remedial agents are concerned, and are willing to compete fairly and in the open with any professional sect, cult or creed. Even the devil can be conquered by truth.

Proceedings of Societies

The Piedmont (Va.) Medical Society

Met at The University of Virginia Hospital, Saturday May 26th, with a registered attendance of thirty-eight physicians.

Among the cases shown at the clinical demonstrations was one of Multiple Exostosis, by Dr. I. A. Bigger; Osteitis Fibrosa Cystica, Dr. S. H. Watts; Endocarditis, Dr. H. B. Mulholland; Some Common Eye Diseases, by Dr. R. F. Compton; Types of Paralysis Due to Syphilis, by Dr. D. C. Smith; Rectal Examination in Prostatic Obstruction, by Dr. J. H. Neff; Pernicious Anemia; Pneumonia Simulating Typhoid, by Dr. J. S. Davis.

After the banquet, Dr. J. C. Flippin read a paper entitled "Some Types of Purpura with Report of Cases," and Dr. W. H. Goodwin one on "Syphilis of the Bones."

Election of officers for the ensuing year was as follows: President, Dr. E. D. Davis, of Standardville; Vice-Presidents, Dr. J. F. Thaxton, Tye River and Dr. M. L. Rea, Charlottesville, Va.; Secretary-Treasurer, Dr. Lewis Holladay, (re elected) Orange, Va. The next meeting will be held in Charlottesville the last Saturday in November.

LEWIS HOLLADAY, *Secretary.*

The Accomack (Va.) Medical Society

Held a meeting in Onley, Va., May the 3rd. This was the first meeting of the Society since 1919 and was a most enthusiastic one. There were eighteen members and several visitors in attendance. In the absence of the president, Dr. W. F. Kellam, Onley, the meeting was called to order by Dr. W. W. Kerns, of Bloxom. Dr. J. Fred Edmonds, Accomack, was elected a member, and Dr. John O. Gaston, recently elected County Health Officer, and Miss Sarah Crosley, County Nurse, were elected to honorary membership. Talks were given by Dr. Gaston, Mr. A. H. Straus, of the State Board of Health, Richmond, Dr. Geo. C. Payne, recently elected State Epidemiologist of Virginia, and several others.

Dr. J. L. DeCormis, Accomack, was elected president, Dr. W. M. Burwell, Chincoteague, vice-president, and Dr. John W. Robertson, Onancock, secretary-treasurer.

The Medical Society of Virginia, Maryland District of Columbia

Held its spring meeting May 16, at Manor Club, near Norbeck, Md., with members of the Montgomery County (Md.) Medical Society as hosts. The papers were of a high type and most interesting. The following officers were elected for the ensuing year: President, Dr. William J. Mallory, Washington, D. C.; vice-president, Dr. Jacob W. Bird, Sandy Spring, Md.; recording secretary, Dr. W. T. Davis; corresponding secretary, Dr. Joseph D. Rogers; treasurer, Dr. Robert Scott Lamb. The last three are of Washington, D. C., and were re-elected. Arrangements for this meeting were in charge of Drs. Joseph D. Rogers, of Washington, and J. W. Bird, of Sandy Spring, Md.

The Graduate Nurses' Association of the State of Virginia and the State League of Nursing Education have Annual Meetings.

The Graduate Nurses' Association held their annual meeting in Richmond, May 23 and 24,

Miss L. L. Odom, of Sarah Leigh Clinic, Norfolk, presiding. The sessions were interesting and largely attended. One of the interesting matters brought up for attention at this meeting was the endorsement of resolutions for the establishment of a chair of nursing at the University of Virginia, in connection with the University Hospital. While no action was taken other than endorsement of the resolutions, the nurses are already making plans for raising the \$50,000 it is estimated such a chair will cost. Miss L. L. Odom, of Norfolk, was re-elected president; Miss Marie Baptiste, Richmond, and Miss Mary Cowling, Lynchburg, vice-presidents; Miss Blanche Webb, Norfolk, secretary; Miss Margaret Cowling, University of Virginia, treasurer; and Misses Agnes Randolph and Elizabeth Webb, Richmond, directors.

Miss Virginia Thacker, of Lewis Gale Hospital, Roanoke, was president of the State League of Nursing Education, which held its meetings on the evening of the 24th and morning of the 25th. At the closing session of the League, Miss Martha Baylor, of St. Luke's Hospital, Richmond, was elected president for the coming year.

The Southwestern Virginia Medical Society

Held its semi-annual meeting in Christiansburg, May 17 and 18, under the presidency of Dr. R. H. Woolling, of Pulaski. The program was most interesting. Fourteen new members were received at this time. The next meeting is to be held in Abingdon, September 19 and 20. Dr. E. G. Gill, Roanoke, is secretary of this Society.

The Medical Association of The Valley of Virginia

Met in Winchester, May 31, under the presidency of Dr. Hunter H. McGuire, of that place. Dr. Alex. F. Robertson, Jr., Staunton, was in his accustomed place as secretary. Dr. George Stragnell, of New York City, was an out-of-State visitor at this meeting, and read a paper on "Psychology in Medicine." There were fifty members and one visitor in attendance. Eight new members were elected. The next meeting is to be held at Staunton, in September, 1923.

Walter Reed Medical Society.

The Spring meeting of this Society was held at Hampton, Va., May 2 and 3, at which time

a most interesting program was enjoyed by those in attendance. Col. Louis A. Thompson, Hampton, was elected president; Dr. Harry D. Howe, Hampton, vice-president, and Dr. L. E. Stubbs, Newport News, was re-elected secretary-treasurer.

State Society News.

GOLF TOURNAMENT BEING ARRANGED TO BE PARTICIPATED IN BY MEMBERS OF THE MEDICAL SOCIETY OF VIRGINIA UPON FIRST DAY OF MEETING.

The Committee of Roanoke Academy of Medicine has completed the formulation of plans for a Golf Tournament to be held on the opening day of the meeting, and with this in view notices have been sent to the Secretaries of the different local organizations throughout the State requesting lists of such members as may be interested, and already replies have been received from twenty-four members who hope to participate.

The contest will be for a cup which will be presented by the Roanoke Academy of Medicine and will be over thirty-six holes. It will be announced later as to whether the awarding of the cup shall be for the one contest or whether it will be of more interest to plan this over a three year period. The handicaps are being worked out and will be reported in detail at a later date.

The Committee wishes to make it clearly understood that the schedule will not in any way interfere with the scientific program for the reason that the tournament will begin on the morning of Tuesday the 16th and will be completed in plenty of time for the opening session in the evening.

The railroad schedules fit in very nicely for those in different sections of the State who are unable to leave home until Monday evening since sleeper accommodations can be had from various directions so that members may arrive here on the early trains of Tuesday. Further details of the contest will be announced later and it is hoped that the tournament may be an enjoyable feature of the meeting.

J. W. PRESTON,
Chairman Publicity Committee.

ROANOKE HOTELS AND THEIR RATES FOR THE MEETING OF THE MEDICAL SOCIETY OF VIRGINIA.

Chairman of the Hotel Committee, Dr. E.

G. Gill, announces the names of the following hotels in Roanoke and the rates they will give for our convention. He suggests that the members make their reservations direct with the hotel managers, and that they make these at an early date. If there is any trouble, however, write the Hotel Committee, Dr. E. G. Gill, MacBain Building, Roanoke, chairman.

Hotel Roanoke,

Single rooms without bath	-----	\$1.50 and \$2.00
Single rooms with bath	-----	\$3.00 and \$4.00
Double rooms with bath	-----	\$5.00 and \$6.00
Double rooms without bath	-----	\$3.50 and \$4.50

Shenandoah Hotel,

Single room with bath	-----	\$2.00 and \$3.00
Single room without bath	-----	\$1.50 and \$2.00
Double rooms without bath	-----	\$2.50
Double rooms with bath	-----	\$3.00 and \$4.00

Ponce de Leon Hotel,

Single rooms with bath	-----	\$3.00
Single rooms without bath	-----	\$2.00
Double rooms without bath	-----	\$2.50
Double rooms with bath	-----	\$4.00

Lenox Hotel,

Single rooms with bath	-----	\$2.00
Double rooms without bath	-----	\$4.00

Raleigh Hotel,

Single rooms without bath	-----	\$1.25 and \$1.50
Single rooms with bath	-----	\$2.50 and \$3.50
Double rooms with bath	-----	\$3.00
Double rooms without bath	-----	\$2.50

Miscellaneous

THE OLD TIME COUNTRY DOCTOR.

Gone is the old time country doctor.

You see him now no more.

With many other old time folk,

He's pass'd to another shore.

Don't you recall the faithful nag

He rode o'er hill and dale?

The saddle bags, too, that always held

The pills that never did fail?

None were so poor, but he would go,

No matter where, nor when.

And we may surely safely say,

He was loved by all good men.

If there's a home across the stream

For saints immortal fair,

That good, old country doctor then,

Is in his home and happy there!

—Edward Madison Jones.

The Truth About Medicine

During April the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

Abbott Laboratories

Neutral Acriflavine-Abbott

Tablets Neutral Acriflavine-Abbott, 0.03 Gm. (½ Gr.)

Enteric Coated Tablets Neutral Arciflavine-Abbott, 0.03 Gm. (½ Gr.)

Hynson, Wescott & Dunning

Phenoltetrachlorophthalein—H. W. & D.

Ampules Phenoltetrachlorophthalein—H. W. & D.

Mallinckrodt Chemical Works

Carbon Tetrachloride Medicinal—M. C. W.

Merck & Co.

Skiabaryt (for Rectal Use)—Merck.

Skiabaryt (for Oral Use)—Merck.

Powers-Weightman-Rosengarten Co.

Carbon Tetrachloride C. P.—P. W. R.

Nonproprietary Articles

Neutral Acriflavine

Carbon Tetrachloride Medicinal.

NEW AND NON-OFFICIAL REMEDIES.

Tincture No. 111 Digitalis—P. D. & Co.—A fat-free tincture of digitalis which, standardized by the minimum lethal dose frog heart method of Hough-ton, is 50 per cent. stronger than tincture of digitalis—U. S. P. The actions and uses of tincture No. 111 digitalis—P. D. & Co., are the same as those of tincture of digitalis. It was introduced at a time when the "fat" of digitalis was believed to cause gastric disturbances. This claim of superiority is not tenable and the preparation is sold simply as a standardized tincture of digitalis. To minimize deterioration through light and air, the preparation is marketed in one ounce amber vials and saturated with carbon dioxide. Parke, Davis & Co., Detroit, Mich. (Jour. A. M. A., April 7, 1923, p. 1003).

Borcherdt's Malt, Cod Liver Oil and Iron Iodide.—Each 100 Cc. contains ferrous iodide 0.88 Gm. (4 grains per fluidounce), cod liver oil, 25 Cc. and Borcherdt's malt extract (plain) 75 Cc. Borcherdt's Malt Extract Co., Chicago. (Jour. A. M. A., April 21, 1923, p. 1143).

Carbon Tetrachloride Medicinal.—Carbon Tetrachloride has narcotic and anesthetic properties somewhat similar to those of chloroform. It has recently come into use as a vermifuge in the treatment of hookworm disease. It also removes some intestinal parasites other than the hookworm. It is reported that usually about 95 per cent. of the hookworms are removed by the first dose. Its use appears to be relatively safe, but serious symptoms and even death have been reported. It is administered in water, milk or gelatin capsules on an empty stomach, followed by a purgative dose of magnesium sulphate.

The dose is from 2 Cc. to 3 Cc. (30 to 45 minims) for adults. Carbon tetrachloride is a heavy liquid, having an odor somewhat like that of chloroform. It is almost tasteless and almost insoluble in water.

Carbon Tetrachloride Medicinal—M. C. W.—A brand of Carbon Tetrachloride Medicinal—N. N. R. Mallinckrodt Chemical Works, St. Louis.

Carbon Tetrachloride C. P.—P. W. R.—A brand of Carbon Tetrachloride Medicinal—N. N. R. Powers-Weightman-Rosengarten Co., Philadelphia. (Jour. A. M. A. April 21, 1923, p. 1143).

Modified Pneumococcus Vaccine.—A vaccine or "antigen" prepared by digesting a suspension of pneumococci, types I, II, III and Group 4 at 37 C., until about 95 per cent. of the organisms have become gram-negative and the mixture is relatively nontoxic to guinea pigs. It is believed that this method yields a vaccine with greater protective power. There is some evidence that this vaccine is of value in the treatment of lobar pneumonia. It is not intended for prophylactic use.

Pneumococcus Antigen-Lilly.—A modified pneumo-

coccus vaccine—N. N. R. It is marketed in 5 Cc. vials, each Cc. containing twenty billion partially autolyzed pneumococci. Eli Lilly & Co., Indianapolis, Ind. (Jour. A. M. A., April 21, 1923, p. 1143).

Sulpharsphenamine-Squibb.—A brand of sulpharsphenamine—N. N. R. (See Jour. A. M. A., March 31, 1923, p. 919). It is supplied in ampules containing respectively, 0.1 Gm., 0.2 Gm., 0.3 Gm., 0.4 Gm., 0.5 Gm. and 0.6 Gm. E. R. Squibb & Sons, New York City. (Jour. A. M. A., April 21, 1923, p. 1143).

Neo-Silvol.—A compound of silver iodid with a soluble gelatin base containing 18 to 22 per cent. of silver iodid in colloidal form. Neo-silvol, even in concentrated solutions, causes neither irritation of mucous membranes nor coagulation of albumin. It does not stain the skin. It is claimed that neo-silvol in laboratory tests for germicidal value has been found as effective as phenol in its action on bacteria. Neo-silvol is intended for the prophylaxis against, and treatment of infections of accessible mucous membranes and is claimed to be indicated in affections of the genito-urinary tract and of the eye, ear, nose and throat. Parke, Davis & Co., Detroit, Mich. (Jour. A. M. A., April 28, 1923, p. 1218).

Phenoltetrachlorphthalein—H. W. & D. A dibasic dye formed by the condensation of phenol and tetrachlorphthalic acid or its anhydride. Phenoltetrachlorphthalein has been used for the determination of the functional output of the liver. It can be used, *in the form of the sodium salt, intravenously*; but cannot be given subcutaneously or intramuscularly. The substance may also be obtained in the form of Ampules Phenoltetrachlorphthalein containing a solution of disodium phenoltetrachlorphthalein. Hynson, Wescott & Dunning, Baltimore, Md. (Jour. A. M. A., April 28, 1923, p. 1218).

PROPAGANDA FOR REFORM.

Alcohol and Disease.—Recently a statistical report regarding the possible influence of alcohol on the prognosis of pneumonia in a large municipal hospital has been published. The data for nearly 3,500 cases of lobar pneumonia showed that, with reference to the patient's habits of indulgence in alcoholic drinks, the mortality was higher in moderate users than in light users or abstainers, and that the mortality is much higher in excessive users than in moderate users. It must be borne in mind, however, that these statistics have no bearing on the use of alcohol in therapy. (Jour. A. M. A., April 7, 1923, p. 1007).

Incompatibility of mercurochrome—220, soluble with local anesthetics and alkaloids.—An accident from the precipitation of mercurochrome-220 soluble by procain has been reported. The A. M. A. Chemical Laboratory has confirmed the incompatibility. The following local anesthetics were found to give precipitates when treated with mercurochrome-220 soluble solution: alypin, apothetin, benzocain, butyn, cocain, hydrochlorid, Beucain lactate, phenacain, procain, propaesin, quinin and urea hydrochlorid, tropacocain hydrochlorid and stovain. Many vegetable alkaloids were also found to be incompatible with mercurochrome-220 soluble. (Jour. A. M. A., April 14, 1923, p. 1091).

A rapidly eliminated digitalis body.—At the request of the Council on Pharmacy and Chemistry, Dr. R. A. Hatcher undertook to elaborate a digitalis preparation that would be stable, that would contain a definite amount of the readily absorbable principle and that would be suitable, if possible, for intravenous administration. As a result of his work he has isolated a digitalis body which behaves unlike any constituent of digitalis heretofore described. A nearly fatal dose is eliminated within a few hours

after its introduction into a cat. It remains to demonstrate the therapeutic value of this new digitalis preparation through the co-operation of the clinician and the pharmacologist. The intravenous administration of digitalis is rarely necessary if digitalis is properly given by mouth. For rare cases in which intravenous medication administration is indicated, it appears that Dr. Hatcher has prepared a drug whose action is less persistent than other digitalis preparations now available and which is simply and inexpensively prepared. (Jour. A. M. A., April 14, 1923, p. 1072).

Nephritin (Reed and Carnrick), was reported on by the Council on Pharmacy and Chemistry in 1907. The following is a summary of this report: The advertising claims for Nephritin are based on the theory that certain granules in the renal cells, called "grains of segregation" and claimed to have been observed microscopically, carry on the secretion of urinary constituents and that a deficiency of them is the cause of nephritis. While Renaut, who formulated the theory, recommended as a cure for nephritis the maceration of fresh kidneys in physiologic sodium chlorid solution, Reed and Carnrick urged objection to the maceration and explained that nephritis represents all the action of the maceration, but is fifty times as potent. Nephritin is stated to be "the grains of segregation from the cortex of the pig's kidney, the renal connective tissue being eliminated." It appeared impossible that the microscopic structures claimed to be present in nephritis could be isolated as such from the connective tissues, and, on inquiry by the Council, no information on this point was to be had. Further, the firm presented no evidence for the claimed action of nephritin or for the claim that it was fifty times stronger than the maceration. (Jour. A. M. A., April 21, 1923, p. 1167).

The treatment of syphilis.—The general view is that neither mercury or arsphenamin positively cures in cases in which the disease has existed long enough to become well established as a systemic disease, but that they both tend to cure and that both are valuable in treatment. It is the general opinion of syphilologists that when chancres are seen that are unmistakable, these cases should be vigorously treated and that there is a good chance of aborting the disease at this time. If early cases are not treated until the Wassermann reaction has become positive, there is a difference of opinion as to treatment. There are syphilologists who believe that these early cases are better treated by mercury alone until the patient has had an opportunity to develop all the immunity of which he is capable. After the patient has established all the resistance of which he is capable, these syphilologists would treat with mercury and arsphenamin. It is becoming increasingly apparent that the advantages of the new method of treating syphilis in which arsphenamin plays the larger part, are by no means certain. The trend of the last few years has been in the direction of placing more reliance on mercury and the older methods in the treatment of syphilis. (Jour. A. M. A., April 21, 1923, p. 1167).

Herradora Specialties not accepted for N. N. R.—Early in 1922 the Scientific Chemical Co., New York City (Marcus Aurelio Herradora, M. D., President), requested the Council on Pharmacy and Chemistry to consider his intravenous preparations. The firm sent specimens of the following products "for Intravenous Use": Herradora's Arsenic Compound, Nos. 1 to 6, Herradora's Arsenic and Hypophosphites, Herradora's Arsenic and Iron Compound, Herradora's Calcium Compound, Herradora's Calcium-Sodium-Glycerophosphate, Herradora's Chlorids Compound, Herradora's Chlorids with Iron Compound, Herra-

dora's Creosote Compound, Nos. 1 and 2, Herradora's Digitalin Compound, Herradora's Glycerophosphate-Iron and Nickel Compound, Herradora's Guaiacol Compound, Herradora's Iodids Compounds, Herradora's Hexamethylenamine and Guaiacol Compound, Herradora's Iron, Manganese and Nickel Compound, Herradora's Mercury Compound, Herradora's Quinine Compound, Nos. 1 and 2, Herradora's Sodium Iodid, Herradora's Sodium Iodid-Salicylate-Guaiacol Compound.

After examining the submitted evidence the Council concluded that the Herradora Specialties were inadmissible to New and Nonofficial Remedies for the following reasons:

1. The therapeutic claims advanced for them are unwarranted and exaggerated, and there is no evidence to warrant the intravenous administration of them.

2. With one exception ("Herradora's Sodium Iodid"), the preparations are mixtures of drugs, the administration of which is not in the interest of sound therapy, particularly when these preparations are intended for intravenous use.

3. Herradora's Sodium Iodid is marketed with unwarranted therapeutic claims.

4. With the exception of Herradora's Sodium Iodid, Calcium Compound, and Iodids Compound, all of the Herradora Specialties are claimed to contain ingredients, the identity and uniformity of which are not insured by their inclusion in the U. S. Pharmacopoeia, National Formulary, or New and Nonofficial Remedies.

The Council submitted its objections to these Herradora Specialties to the Scientific Chemical Co., to permit the firm to meet these objections so far as possible. However, advertising mailed in February, 1923, convinced the Council that the propaganda contained in the firm's advertising is detrimental to the rational practise of medicine and the public welfare. Therefore, it authorized publication of its report. (Jour. A. M. A., April 28, 1923, p. 1259).

Book Announcements

Clinics and Collected Papers of St. Elizabeth's Hospital, Richmond, Va. Vol I, 1922. Contributed by the Staff. Illustrated by Helen Lorraine. St. Louis. C. V. Mosby Company. 1923. Cloth. 8vo. 560 pages. Price \$7.50.

The demand for such volumes as this is no longer questionable. They have appeared at intervals from various hospitals throughout America for many years. The older title "Hospital Reports" has in some cases been changed first to "Collected Papers" and now to "Clinics and Collected Papers." The older reports were printed in limited numbers and save in few cases were not offered for sale. These of the present day are printed in large numbers, extensively advertised by publishers, and are easily accessible to purchase.

The present volume is the first of its kind emanating from a Southern city and for this reason is the cause of peculiar local and regional pride. It is of convenient size, 560 pages,

easily readable, comprehensive and beautifully and abundantly illustrated by Miss Helen Lorraine's superb drawings and many photographs, Roentgenograms and charts. The table of contents is arranged in parts and chapters according to subjects. The index appears to be one hundred per cent perfect. The subjects considered are met with frequently in practice. To read it has been a great pleasure, considerable profit and genuine inspiration. We commend it highly.

Of the total sixty-six contributions, thirty-eight are from Dr. Horsley Sr.; one with the late Dr. R. H. Whitehead of the University of Virginia, one with Dr. Vaughan, and one with Drs. Vaughan and Dodson. Dr. Warren T. Vaughan contributes thirteen papers, one with Dr. Horsley, one with Drs. Horsley and Dodson, one with Miss Van Dyke. From Dr. Austin I. Dodson there are six papers, one with Dr. Vaughan, one with Dr. Ashworth and one with Drs. Horsley and Vaughan. There is one contribution from Dr. Paul C. Colonna, one from Dr. J. S. Horsley, Jr., and one by Dr. O. O. Ashworth. None of these three are listed among the members of the staff but are or have been internes.

The book is made of case reports not hitherto published and reprinted journal contributions from various members of the staff. The first 31 pages, introductory in purpose, are occupied by short papers from the Superintendent, Miss Stone, the business manager, Mr. Todd, the Dietitian, Miss Van Dyke, and a charming story by the Illustrator, Miss Lorraine, giving a brief outline of the history of medical illustrating.

The short article by Miss Stone is especially valuable for the spirit of human kindness exhibited by the Superintendent and all internal officers and employees toward patients and should be read and emulated.

Miss Van Dyke, the dietitian, reminds us that many human beings "live to eat;" and applies to hospital management the idea embodied in an axiom from the commercial world, "A satisfied customer is the best advertisement." She might also have reminded us that

"We may live without music,
We may live without books,
But civilized man
Cannot live without cooks."

There is also an interesting article by Miss Van Dyke and Dr. Vaughan on Postoperative

Dietotherapy. This should be studied especially by nurses, to learn the harmfulness of the pernicious practice of spoiling delicious lemonade by decorating it with white of egg.

This being the first volume, opportunity was taken for preservation of some of the older contributions of Dr. Horsley, some of which date back as far as 1910.

There are reports of much research work on the part of Dr. Horsley, especially in operative technique upon the stomach, intestines and blood vessels, and one instructive report showing the negative results of experimental reconstruction of the common bile duct.

Considerable text and many beautiful illustrations are devoted to plastic work about the face and neck, cancer in general and of the breast and skin. In this part of surgery Horsley is an artist in the class with Miss Lorraine.

On pages 365 and 366 are two photographs of a remarkable case of a patient weighing 105½ lbs. before and after being removed from an ovarian cyst weighing 116½ lbs.

The oration, "The Ideals of the Surgeon," is a genuine and eloquent inspiration and should be read and re-read by every aspiring surgeon.

The writings of Dr. Vaughan are extremely interesting and show thorough study. Especially instructive are the case reports of "Allergic Headache" and a paper on "Lead Poisoning from Drinking Moon-Shine Whiskey."

The anatomy of a six-legged dog by Dr. J. S. Horsley, Jr., written while a student at the University of Virginia, is a remarkable study by this scholarly son of the elder Horsley.

The volume before us, like much of current literature, shows progress in standardization of surgeons and we hope that the time is not far distant when we will have a report entitled "Clinics, Collected Papers and the Immediate and Ultimate Effects of Surgical Operation and Medical Treatment in Every Patient Treated." In this way and in this way only, can doctors have a real basis upon which to refer patients for superior special treatment and hospital managers a real basis upon which to appoint staff members. We welcome this volume and wish for speedy progress in this direction on the part of every surgeon in every hospital in America.

Dr Horsley has issued at least two annual reports of St. Elizabeth's Hospital, 1921 and

1922. The "Clinics and Collected Papers" would have been improved by the inclusion of these two reports. We hope this will be done next year.

G. P. LA ROQUE.

Dreads and Besetting Fears. Including States of Anxiety, Their Causes and Cure. By TOM A. WILLIAMS. M. B., C. M. Membre Correspondant Etranger de la Societe de Neurologie de Paris. Membro Correspondente Academia Nacional de Medicina do Rio de Janeiro, etc. Neurologist to Freedman's Hospital. Boston Little, Brown, and Company. 1923. Mind and Health Series. 12 mo. Cloth. 217 pages. Price, \$1.75 at booksellers.

The Unadjusted Girl. With Cases and Standpoint for Behavior Analysis. By WILLIAM I. THOMAS. Foreword by MRS. W. F. DRUMMER. Boston. Little, Brown, and Company. 1923. Criminal Science Monograph No. 4. 8vo. Cloth. 261 pages. Price \$3 net.

Applied Psychology for Nurses. By DONALD A. LAIRD, Assistant Professor of Psychology, University of Wyoming; Lecturer in Nursing Psychology, Ivinson Memorial Hospital School of Nursing. J. B. Lippincott Company. Philadelphia and London. Lippincott's Nursing Manuals. 1923. 8vo. Cloth. 236 pages with 49 illustrations. Price \$2.50.

Senile Cataract. Methods of Operating. By W. A. FISHER, M. D., F. A. C. S., Chicago, Ill. Professor of Ophthalmology, Chicago Eye, Ear, Nose and Throat College, etc. With the collaboration of PROF. E. FUCHS, Vienna, Austria; PROF. I. BARRAQUER, Barcelona, Spain; LT. COL. HENRY SMITH, London, England; DR. H. T. HOLLAND, Shikarpur, Sind, India; DR. JOHN WESTLEY WRIGHT, Columbus, O. 256 pages. 160 illustrations, 112 of which are colored. Published by Chicago, Eye, Ear, Nose and Throat College, Chicago, Ill. 12mo. Cloth. Price \$2.50 and will be sent postpaid on approval.

Merck's Manual of the Materia Medica. Fifth Edition. A Ready Reference Pocket Book for the Physician and Surgeon. Compiled and published by Merck and Company. New York, St. Louis, Montreal. Works at Rahway, N. J. 1923. 581 pages. Flexible linen cloth, 50c; artificial leather, \$1.00.

Venereal Disease in the American Expeditionary Forces. By GEORGE WALKER, M. D., Late Colonel, Medical Corps, U. S. A. Medical Standard Book Company, Baltimore, Md. 1922. 8vo. Cloth. 237 pages.

Nursery Guide for Mothers and Nurses. By LOUIS W. SAUER, M. A., M. D. Senior Attending Pediatrician, Evanston Hospital; formerly Attending Physician Chicago Infant Welfare, etc. St. Louis. C. V. Mosby Company. 1923. Illustrated. Cloth. 188 pages. Price \$1.75.

The Heart in Modern Practice. Diagnosis and Treatment. By WILLIAM DUNCAN REID, A. B., M. D., Chief of Heart Clinic at Boston Dispensary; Junior Assistant Visiting Physician and Member of Heart Service at Boston City Hospital. Philadelphia and London. J. B. Lippincott Company. 1923. 32 illustrations. 352 pages. 8vo. Cloth. Price \$5.00.

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Editorial

Influence of Insulin on the Symptoms of Diabetes Mellitus.

From the time of Celsus and Aretaeus, who lived in the first century of the Christian era, to the present time, the ugly symptoms of diabetes have all but baffled the best efforts of the medical profession. The dieting of diabetics, in late years, however, has enabled physicians to assuage the course and modify the degree of severity of some of the more harassing symptoms of this ancient disease, but it is only with the advent of this potent extract of pancreas, insulin, produced in a form innocuous to the body, when subcutaneously injected in properly guarded dosage, that the physicians have come into the possession of an agent of unsurpassed metabolic importance. This new product possesses the power accurately to reduce, for definite periods of time, the severity, and often altogether, remove the ugly symptoms of diabetes. The voracious appetite, the extreme thirst, the copious secretion of urine, and the emaciation of the body, no longer need be dreaded, because insulin will drive "these wolves" away. Before the hypodermic syringe of insulin, properly administered, even coma relaxes its grip upon the brain. Insulin displaces the anesthetizing poison of perverted fat metabolism for carbohydrate metabolism.

THIRST

Thirst has always been one of the most annoying symptoms of diabetes. Many of

these patients only begin to recognize that there is something wrong with them when they realize that they have an unusual and insatiable thirst. This symptom is quickly alleviated by the use of insulin; it disappears as the blood sugar curve falls toward the normal level. In connection with the disappearance of thirst, there is marked relief from dryness of the mouth and viscosity of the saliva. The whole status of the mouth improves at once with the use of insulin. Our experience of the use of insulin justifies the assertion that, for the alleviation of this group of symptoms, alone, the discovery of insulin should rank high in the list of important medical discoveries.

APPETITE AND HUNGER

The administration of insulin, in connection with the adjustment of a diet suitable to the needs of the patient, is attended by a distinct surcease from the "bread riot" that is ever raging in the epigastrium of the diabetic. Physiologically, there may be a difference between appetite and hunger, or, at least, they may be explained on different theories, but in the life of a diabetic, appetite is more than a "complex of sensations operating in the nervous system along with memory impressions of the sight, taste, and smell of palatable food," an empty stomach. Appetite and hunger operate upon the mental and moral attributes of the diabetic with profound effect and any agent that may help lessen the gnawing appetite and relieve the pangs of hunger by the normal intake of food is worthy of honorable mention in the category of therapeutic agents. As insulin reduces the hyperglycemia, the distressing hunger is relieved and the appetite is more normally appeased. In all our cases, this remarkable effect has been observed. The patients comment themselves with gratifying satisfaction upon the great relief felt in the liberation from constant and unremitting sensations of recurring hunger, so long an annoyance.

POLYURIA

The enormous quantity of urine secreted by diabetics, in some cases, amounts to a consideration of great importance in its symptomatology. This symptom, while not always of paramount importance with the patients, is one that stands out as significant and is, indeed, discomforting as it is characteristic. Some

patients are so pressed by the desire to void a distended bladder of urine, that they must urinate at very short intervals. Such an exigency amounts to a serious symptom. This, also, is one of the unpleasant features of the disease that yields to the use of insulin in connection with diet. Few patients fail to remark that the night's sleep is no longer interrupted by the necessity of voiding large amounts of urine, as was the case before insulin and diet were begun. Most of our cases have secured relief from this symptom and its companion symptom of thirst as the high blood sugar level yielded to the influence of insulin.

STRENGTH AND EMACIATION

Langor and weakness, along with loss of weight, have long stood out as a group of symptoms more or less constant in diabetes, varying in degree with the type and severity of the disease. In mild or incipient cases, the emaciation and body-strength are not so obtrusive as in the severe or malignant forms. But nevertheless, in diabetes, weakness and loss of weight rather uniformly appear and are important evidences of the disease and serve to subjectively affect the patient profoundly. One of our patients has repeatedly expressed the opinion that, following her daily dose of ten units of insulin, she feels for four to six hours a definite and clear-cut exhilaration of body and mind. This patient has said that the ten units given to her before noon "stimulates" her until bedtime and that now her mind "works better" than it has for years. But in nearly all cases, the patients say that they feel stronger and have more endurance than they had before the use of insulin. In this respect, our patients have commented more emphatically than they have during the course of the mere dietary treatment in which the urinary-sugar examinations served as a guide for the amount of carbohydrate given. Probably, the same wholesome effect of increase in strength would have been gotten had the blood sugar curve been as carefully lowered by fasting and slow-carbohydrate feeding in dietary treatment. The insulin and diet treatment give control over hyperglycemia and in that way favorably affect the strength and well-being of the diabetic to a remarkable degree. Again, the gain of weight, within limits in selected cases, may be permitted with the administration of the carbohydrate-oxidizing-

insulin. This fact, if proven to be uniformly so, will be a decided advance in the management of diabetics on the low-maintenance and under-nourishment regimes. It would seem then that insulin offers the diabetic the opportunity to increase his weight, without running the risk of further weakening his carbohydrate mechanism.

SCALP-SKIN-NAILS SYMPTOMS

Symptoms of the scalp, skin and nails are indeed definitely benefited and healed by the use of insulin. Dryness and itching of the scalp and skin yield to insulin. Eczema and pruritus, boils and carbuncles, hang nails, and ulcers in the scalp—conditions that have annoyed the patient for years—yield to the adequate and carefully controlled administration of insulin. One of our cases had suffered for years with rodent ulcers of the scalp which had denuded areas of the scalp of hair the size of a dime. The administration of forty units of insulin daily brought his blood sugar from 460 milligrams of blood sugar per 100 c.c. of blood to 160 milligrams of blood sugar per 100 c.c. of blood and with a complete cure of the ulcers and the formation of cicatricial tissue.

DIABETIC ACIDOSIS AND COMA

We must remember that the acidosis of diabetes, unlike that of nephritis, is due to the formation of aceto-acetic and beta-oxybutyric acid in the tissues and body fluids as a result of a faulty fat metabolism. The faulty fat metabolism is the result of the effort of the body to employ fat as a substitute. As complete combustion of fat is dependent upon a "flame of burning sugar," and as in diabetes this necessary bed of burning sugar in the body furnace is very dull, and sometimes all but "out," the effort to use the substitute fat fuel is attended by the smoke of incomplete combustion.

From this condition, ketone bodies show in the urine of the diabetic and indicate that the patient is in a state of acid poisoning. This is the forerunner and ultimately the cause of diabetic coma. In our patients who have shown the presence of an excess of ketone bodies, the use of insulin was attended by prompt improvement. Two of our cases gave evidences of profound acid poisoning. A woman of 65 years was in profound coma with marked ketonuria and a blood sugar of 580 milligrams of blood sugar per 100 c.c. of

blood. The patient's blood sugar fell in the course of two days to 360 milligrams per 100 c.c. of blood. The dose of insulin used in this case was large and repeated every hour. The patient received also the usual water and fruit juice treatment.

In another case of beginning coma, the patient responded to insulin, fruit juice, water treatment. The ketones disappeared from the urine, the bad mental symptoms disappeared, and the patient quickly showed sugar free urine.

In the milder cases of diabetes with ketonuria, the patient may be prepared for dietary treatment by a temporary insulin treatment. Such patients, with the careful use of insulin, may become free of acidosis, and the maintenance diet required for the patient may be more quickly learned. It is probably not an overstatement to say that, in this phase of diabetes (ketosis and coma) insulin exerts its most spectacular power. For this dangerous condition, the physician now possesses in insulin an antidote of a definite potency, it seems.

Finally, upon all the cardinal symptoms of diabetes in man insulin exerts an immediately favorable influence for short period of time. To remove the symptoms of diabetes altogether and permanently to rid the diabetic body of the harassing symptoms that characterize the disease, it is necessary to inject into the body at intervals certain unit doses of this potent extract of the pancreas, and to restrict the introduction into the diabetic body of carbohydrate food, and to adjust this restriction in connection with the fat and protein of the diet, with a view to meeting the requirements of the nitrogen balance, ketogenic—antiketogenic balance, and total (caloric) body needs.

News Notes

Commencement Exercises of Virginia Medical Schools

Brought with them this year, as in the past, mingled joy and sorrow for the fulfillment of aims and ambitions and because it was the parting of the ways to those who have been closely associated for several years. However, an opportunity for the renewal of these relations is to be had through medical societies and, for this purpose, if no other, we wish to emphasize the need of all members of the

graduating classes affiliating themselves with the county and State organizations in the communities in which they locate.

MEDICAL COLLEGE OF VIRGINIA

Exercises commenced Saturday the 2nd, with a minstrel show by the students in John Marshall High School Auditorium. On Sunday, Rev. Fred R. Chenaunt, D. D., of Broad Street Methodist Church, delivered the baccalaureate sermon. Alumni day was observed on Monday, June 4, Dr. Manfred Call, Richmond, presiding and a reunion dinner was held at Commonwealth Club that evening. At the meeting of the alumni it was planned to have a drive to raise \$3,000,000 for a proper expansion of the school. A part of this is to be raised for immediate uses.

At the meeting of the Board of Visitors on the same day, Dr. St. George T. Grinnan, acting professor of pediatrics, was elected to fill the vacancy caused by the death of Dr. McGuire Newton. Dr. Grinnan will take up his duties in this new position at the opening of the school in September.

A business meeting of the General Alumni Association was held on Tuesday morning, the 5th, and this was followed by a luncheon in the College building.

Commencement exercises at Strand Theatre, on the evening of the 5th, were followed by a reception and dance at Commonwealth Club, in honor of the graduates in medicine, dentistry, pharmacy and nursing. There were 43 graduates in medicine, 36 in dental surgery, 34 in pharmacy, and 9 in nursing—the largest number of graduates from the Medical College of Virginia since 1913.

Hospital appointments are as follows:

Memorial Hospital, Richmond—Drs. Rowland H. Edwards, Palls; John A. Mease, Jr., Sandy Level; Louis Perlin, Richmond; Lee S. Liggan, Richmond; Leta J. White, Greenwood, S. C.; Cornelia W. Segar, Hampton; Joseph P. Treccise, Butler, Pa.

Johnston-Willis Sanatorium, Richmond—Drs. Bolling J. Atkinson, Champe, and William P. Bittinger, Gerrardstown, W. Va.

Retreat for the Sick, Richmond—Drs. Percy R. Fox, Penola; Samuel P. Hileman, Rockbridge Baths; Henry H. Menzies, Richmond.

Stuart Circle Hospital, Richmond—Drs. Emerson M. Babb, Ivor; Earnest M. Wilkinson, McKenney, and undergraduate R. B. Groves.

St. Luke's Hospital, Richmond—Drs. Joseph T. Graham, Draper, and Rogers N. Harris, Whites.

Pine Camp Hospital, Richmond—Dr. Francis J. Clements, Cartersville, and undergraduate H. T. Garriss.

City Home Hospital, Richmond—Undergraduates F. Norman Bowles, G. T. Colvard and W. F. Matthews.

Mercy Hospital, Baltimore, Md.—Dr. Robert R. Jones, Walnut Cove, N. C.

Long Island Hospital, Boston, Mass.—Dr. Churchill Robertson, Salem.

C. & O. Hospital, Clifton Forge, Va.—Dr. Robert P. Hawkins, Jr., Clifton Forge.

Pittman Hospital, Fayetteville, N. C.—Dr. John N. Robertson, Charlotte C. H.

St. Francis Hospital, Jersey City, N. J.—Drs. Wyatt S. Beazley, Jr., Richmond; Sam R. Cozart, Stem, N. C.; Homer B. Luttrell, Amissville.

Elizabeth Buxton Hospital, Newport News, Va.—Dr. Waverly Randolph Payne, Midlothian.

City Hospital, New York City—Drs. Fielding Combs, Honaker, and Joseph E. Burns, Goldston, N. C.

Gouverneur Hospital, New York City—Dr. Phil H. Neal, South Boston.

Lenox Hill Hospital, New York City—Dr. William I. Owens, Richmond.

Northwestern General Hospital, Philadelphia—Dr. Clarence E. Perkins, Newport News.

Philadelphia General Hospital, Philadelphia—Dr. Edwin R. Mickle, Nathalie.

Muhlenberg Hospital, Plain Field, N. J.—Dr. Benjamin E. Glass, Carteret, N. J.

The other graduates in the School of Medicine are:

Benjamin F. Bailey, Ft. Defiance.

William H. Batte, Jr., Jarratt.

John G. Davis, Jr., Roanoke.

Honston L. Gwynn, Yanceyville, N. C.

Frank E. Handy, Emory.

Hummie Z. L. Horton, Apex, N. C.

Robert S. Kyle, Woodlawn.

John P. Lilly, Athens, W. Va.

John W. McNabb, Belleville, Pa.

Harry T. Schiefelbein, New Lisbon, Wis.

Archer A. Wilson, News Ferry.

UNIVERSITY OF VIRGINIA.

Commencement exercises at the University of Virginia began on Sunday, June 10, with the

Baccalaureate Sermon by the Rev. Walter William Moore, President of the Union Theological Seminary, Richmond, Va. The graduating class, including the Doctors of Medicine, attended this exercise in a body in academic costume.

At 7:30 p. m. on the same day, there was an organ recital in the McIntire Theatre by Mr. Henry H. Freeman, Director of St. Paul's Choir, Washington, D. C., assisted by Elizabeth Bernadine Thornberry, Soprano.

On Monday, June 11, Departmental Alumni Meetings were held in Peabody Hall at 9:30. Dean Hough outlined the growth of the Medical School during the past fifteen years and the plans for its future development.

These departmental meetings were followed by the Annual Alumni Meeting in Peabody Hall at 11, and this meeting was followed by the Alumni luncheon at the University Commons, the alumni orator being the Hon. Mendel L. Smith.

At 8:15 p. m. the Phi Beta Kappa address was delivered in Madison Hall by the Rev. Beverley Dandridge Tucker, Jr., of St. Paul's P. E. Church, Richmond, Va. On this occasion the Phi Beta Kappa keys were delivered to the initiates of this session. Among these initiates were the following members of the graduating class in medicine:

Vincent W. Archer, Monroe J. Epting, Robert B. Hiden, John P. Williams.

Other members of the graduating class who had previously been initiated into Phi Beta Kappa upon graduating from the college were:

Eugene L. Lowenberg and Caldwell J. Stuart.

Six members of the graduating class had also been initiated on April 12, into the honor medical society, Alpha Omega Alpha, as follows:

Silas E. Chambers, Monroe J. Epting, Robert B. Hiden, Eugene L. Lowenberg, Caldwell J. Stuart, John Powell Williams.

On Tuesday, June 12 at 10 a. m. the graduating classes of all departments joined in the class exercises held in the McIntire Theatre, and at 5 p. m. the final exercises and conferring of degrees took place. The graduating class was addressed by Mr. Homer S. Cummings, of Stamford, Conn. The names of the graduating class are given below. These exercises were followed at 7 p. m. by a reception

to the graduates, their relatives and guests in Madison Hall.

In addition to these exercises, a number of athletic and social events were held. On Saturday afternoon, June 9, was the Varsity-Alumni baseball game, and on the afternoon of Monday, June 11, there was a game between the University of North Carolina and Virginia. Both of these were played on Lambeth Field.

The Alumni Ball was held on the evening of Monday, June 11, and the Final Ball on Tuesday, June 12. The graduates in medicine with their hospital appointments are as follows:

V. W. Archer, B. S., Black Mountain, N. C., Roentgenologist, Black Mountain Sanitarium, Black Mountain, N. C.

Walter Weyman Benton, Winder, Ga., Ancon Hospital, Ancon, Canal Zone.

Launcelot Minor Blackford, B. S., University, Va., Union Memorial Hospital, Baltimore, Md.

Louis Christian Brand, Staunton, Va., University of Virginia Hospital, University, Va.

Albert A. Creecy, B. S., in Medicine, Norfolk, Va., Sarah Leigh Hospital, Norfolk, Va.

E. P. Cardwell, Wilmington, N. C., Orange Memorial Hospital, Orange, N. J.

S. E. Chambers, Basic, Va., Mercy Hospital, Baltimore, Md.

Samuel Wesley Eason, B. A., Norfolk, Va., Jersey City Hospital, Jersey City, N. J.

Monroe Jacob Epting, Jr., B. A., Savannah, Ga., St. Luke's Hospital, New York City, N. Y.

Richard T. Ergenbright, Charlottesville, Va., Worcester City Hospital, Worcester, Mass.

Richard Dulany Gill, Leesburg, Va., University of Virginia Hospital, University, Va.

William H. Glass, Gainesville, Fla., Orange Memorial Hospital, Orange, N. J.

Robert B. Hiden, A. B., Pungoteague, Va., Instructor in Physiology and Biochemistry for 1923-24, University of Virginia.

Clack D. Hopkins, Richmond, Va., Flushing Hospital, New York City, N. Y.

W. B. Hubbard, Broadway, Va., Instructor in Anatomy for 1923-24, University of Virginia.

Charles I. Johnson, B. S., Montgomery, Ala., Kenmont Coal Co., Jeff, Ky.

Thomas Duckett Jones, B. A., Petersburg, Va., University of Virginia Hospital, University, Va.

Eugene Lowenberg, B. S., Norfolk, Va., Lenox Hill Hospital, New York City, N. Y.

Ray Jackson Neff, B. A., Chilhowie, Va., University of Virginia Hospital, University, Va.

H. Lamont Pugh, Crozet, Va., U. S. Navy.

Willard G. Rainey, Greensboro, N. C., St. Elizabeth's Hospital, Richmond, Va.

Samuel Harvey Rivers, B. A., Dryden, Va., University of Virginia Hospital, University, Va.

C. J. Stuart, B. A., Washington, Va., U. S. Navy.

Charles W. Scott, Port Republic, Va., University of Virginia Hospital, University, Va.

Richard Green Waterhouse, B. A., Emory, Va., St. Elizabeth's Hospital, Richmond, Va.

William Weston, Jr., B. A., Columbia, S. C., Johns Hopkins Hospital, Baltimore, Md.

John Powell Williams, B. A., Richmond, Va., St. Luke's Hospital, New York City, N. Y.

States Advance in Safeguarding Health of Working Children.

Twenty-two States now require the physical examination of every child applying for an employment certificate, according to the newly revised edition of a bulletin on "Physical Standards for Working Children," issued by the U. S. Department of Labor through the Children's Bureau. The bulletin contains the recommendations of a committee of physicians who were appointed by the Bureau to prepare a standard form for use in examination of children seeking to enter employment.

Since the publication of the first edition of the bulletin, two years ago, a considerable number of changes have been made in the various State laws with reference to such examinations, and the summary of legal provisions which it contains has now been brought up to date. One State, Virginia, is said to have advanced in this respect to a stage beyond that of the other States, in that it now requires the examination of every working child at regular intervals during the years when he is especially susceptible to the strains of industry. It should thus be possible to determine whether the work at which he is engaged is injuring his health or interfering with his normal development. In certain other States a child must be re-examined when he goes from one employer to another, but since he may remain with his first employer until

he passes the certificate age, the bulletin points out that this is not so adequate a provision as the new Virginia law.

In addition to the twenty-two States requiring a physical examination for every child before an employment certificate is first granted, eight others and the District of Columbia allow the certificate-issuing officer to require an examination when he is in doubt as to the child's physical fitness, but many officers, it is said, do not realize the importance of this phase of their work. In eighteen States there is still no legal provision of any kind for examination, even when a child first enters employment.

Age Old Quackery Still in Use.

As several cases have recently come to the attention of the State Bacteriological Laboratory where persons bitten by mad dogs had resorted to the mad stone for cure instead of taking Pasteur treatment, A. H. Straus, director of the State laboratory, applied to the Attorney-General of the State for an interpretation of the law as to whether people applying the mad stone for pay could be prosecuted under the Medical Practice Act, for practicing medicine without a license. Attorney-General Saunders gives the following opinion:

"After examining Section 1622 of the Code of 1919, I am of the opinion that any person who attempts to cure the bite of a mad dog by the use of a mad stone, for compensation, is engaged in the practice of medicine within the definition found in this section of the Code, and that in all such cases, where the person is not a licensed practitioner, you should report the facts to the attorney for the Commonwealth of the county in which such offense occurs, with the request that the party be prosecuted."

In view of the above, we would suggest that if any of our readers know of cases where the mad stone is applied for compensation, they report name of person using it to this office that the Medical Society of Virginia may assist the Medical Examining Board of Virginia in prosecuting such person.

Memorial to Dr. McGuire Newton.

A number of the friends and admirers of the late Dr. McGuire Newton, noted child specialist of Richmond, have secured a charter for the McGuire Newton Foundation. It is the purpose of this Foundation to create a \$100,000 children's clinic in Richmond, as a

memorial to Dr. Newton, which will be known as the McGuire Newton Memorial Clinic. To assure the permanency of the Clinic, which is to be operated exclusively for the treatment of children's diseases, it is provided that only the income from the endowment can be used in maintaining the Clinic, and, in case of the resignation or death of any member of the board of trustees, of the Foundation, his or her successor is to be named by the board of trustees, which is to have sole power in the administration of the funds. H. W. Ellerson is chairman of the Foundation, and temporary offices are at 1010 Floyd Avenue, this city, the former home and offices of Dr. Newton.

The new class formed at the spring reunion of the Ancient and Accepted Scottish Rite Masonry, the day of Dr. Newton's funeral, took the name of "McGuire Newton Class." This name was adopted in honor of Dr. Newton and symbolizes the work which this class will do toward the relief of crippled children, a movement which the Scottish rite has long fostered.

Dr. Charles A. Young,

Formerly House Surgeon of the Wills Eye Hospital of Philadelphia, is now located in Roanoke, Va., with offices at 612-614 MacBain Building.

Dr. W. V. Atkins,

Blackstone, Va., was called to Front Royal, Va., the first of this month on account of the illness of his granddaughter.

Results of T. B. Seal Sales.

Salem led all the cities in the State of Virginia in the per capita sale of Christmas Seals during the last campaign with a per capita sale amounting to over 13 cents. Petersburg, the second city, had a per capita sale of nearly 10 cents. In county sales, Henrico won first place with a per capita sale of 4 cents.

In Virginia 63 counties increased the amount of their sales over the past year. Some of the larger cities, however, showed a decrease.

The Virginia Tuberculosis Association has received to date the sum of \$55,045.56 from the sale of Seals with \$200 yet to be transmitted. The sale will exceed that of last year by about \$1,000. Out of the sum raised, \$36,543.28 will be distributed to the counties and cities for local tuberculosis work, \$15,750 going to the Virginia Tuberculosis Association and \$2,752.28, representing 5 per cent. of the

gross proceeds, going to the National Association.

The Virginia Pharmaceutical Association

Is to hold its annual meeting at Virginia Beach, June 25, 26 and 27. H. E. Orchard, of Lynchburg, is president, and A. L. I. Winne, of Richmond, secretary.

High Rate of T. B. in Porto Rico.

Dr. J. G. Townsend, of the U. S. Public Health Service, who recently returned to this country after a five months' study of tuberculosis in Porto Rico, states that there is a high tuberculosis death rate in this island. The rate is a little more than 200 per hundred thousand, which is greater than in any State in the Union except Colorado, where the tuberculosis death rate is enormously increased by the constant immigration of tuberculous patients, many in the last stages of the disease. The high rate in Porto Rico is especially among the laboring class and is largely due to the housing and diet conditions under which they live.

Dr. Charles K. Mills,

Philadelphia, was elected president of the American Neurological Association, at its meeting in Boston, early this month. He will preside at the jubilee celebration in Philadelphia, next year, on the occasion of the fiftieth anniversary of the society.

Cost of Operating a Ford.

Tabulations as to the cost of operating a Ford car have just been completed by the State Board of Health, which has since May 1, 1919, been using Fords in its rural sanitation work through Virginia. Excluding garage rent and depreciation, it is seen that the average driver, a man normally careful, can at this time expect to run his Ford over *country* roads, taking the good with the bad and encountering all kinds of weather, at a cost not to exceed \$35 a month, if he has a mileage of approximately 900. Gasoline and oil account for about one-half the total upkeep, the remainder, slightly under fifty per cent., being chargeable to repairs, tubes and tires.

Dr. S. E. Massey,

Recently of Martinsville, Va., has located in Roanoke, Va., with offices in Anchor Building. He will limit his work to diseases of the eye, ear, nose and throat.

Dr. Claude M. Lee

And family are spending the month of June with relatives in Culpeper, Va., before sailing for their home in Wusih, China, where Dr. Lee is a medical missionary.

Married.

Dr. William Benjamin Hopkins, Richmond, Va., and Miss Mary Courad Nicholson, Littleton, N. C., May 6.

Dr. Oscar Bruton Darden, Richmond, Va., and Miss Mary Wyckoff Dunlap, Dunlap, N. C., June 12.

Fresh Air Camp for Crippled Children.

Westhampton College buildings, belonging to the University of Richmond, have been offered to and accepted by a committee in charge of securing quarters for a fresh air camp for the crippled children of Richmond during the summer months. Funds are to be raised by the various committees for the maintenance of the camp during this time.

Dr. William R. Aylett,

Of Newport News, Va., who was recently quite sick at St. Elizabeth's Hospital, Richmond, is now much improved and has returned home.

Dr. William Banner Moore,

Member of the Medical Society of Virginia, for sometime located at Smith, N. C., has moved to Browns Summit, N. C.

Dr. Tom A. Williams,

Washington, D. C., was an invited guest at the meeting of the New York State Medical Society in New York City, May 23rd. The subject of his address was "Besetting and Other Morbid Fears," on which subject he has just published a book.

Work of the Rockefeller Foundation.

On May 14, the Rockefeller Foundation passed the ten-year milestone in its work. Though its chartered purpose, broadly stated, was "the well-being of mankind throughout the world," the work of the Foundation has become chiefly centered upon public health and medical education. The expenditures for the first decade have amounted to \$76,757,040, roughly divided as follows:

Public Health	\$18,188,838
Medical Education	24,716,859
War Relief	22,298,541
All Other Philanthropic Work...	10,445,628
Administration	1,107,174

Contributions outside the field of public health and medical education were made, for the most part, during the war and during the earlier years of the Foundation's work, before its policies and program had become clearly defined. There has been an increasing concentration upon medical education and public health.

Civil Service Examinations.

The U. S. Civil Service Commission, Washington, D. C., announces open competitive examination for reconstruction aide (physiotherapy) and reconstruction pupil aide (physiotherapy), applications to be rated as received, until further notice. Vacancies are to be filled in the Public Health Service and Veterans' Bureau throughout the United States. Competitors will not be required to report for examination at any place, but will be rated on their physical ability, and education, training and experience. For full information and blanks, apply to the above named commission or the secretary of the board of U. S. Civil Service Examiners at the post-office or custom house in any city.

Dr. B. B. McCluer,

Speedwell, Va., recently visited his parents at Bon Air, Va.

Dr. Lester A. Crowell,

Lincolnton, N. C., was elected president of the North Carolina Hospital Association at its recent meeting in Asheville.

Dr. Margaret P. Kuyk,

Richmond, after attending the A. M. A. meeting in San Francisco, this month, will go on to Portland, Ore., for the meeting of the American Association of University Women, to be held there in July.

Dr. D. A. Stanton,

High Point, N. C., has been appointed a member of the N. C. State Board of Health, to fill the unexpired term of Dr. Fletcher R. Harris. Henderson, resigned.

Dr. D. W. Draper,

Of Newport News, Va., is spending some time in Philadelphia, doing post-graduate work in pediatrics.

Dr. Walter E. Dandy,

Of Johns Hopkins Hospital, Baltimore, by invitation delivered an address before the Nor-

folk County (Va.) Medical Society, his subject being "The Localization of Brain Tumors by Air Injections in the Brain."

Dr. Charles R. Robins,

Richmond, was appointed one of the delegates to represent the Society of the Sons of the Revolution in the State of Virginia at the triennial meeting of the General Society of Sons of the Revolution in Boston, June 18 and 19.

Dr. F. O. Plunkett

Has been elected president of the Men's Club of Court Street Methodist Church, Lynchburg, Va.

Officers in the Society of Colonial Wars.

At the annual election of officers of the Society of Colonial Wars of the State of Virginia, held in Richmond, the middle of May, Dr. Alexander G. Brown, Jr., was elected surgeon, and Drs. Francis Whittle Upshur and J. Shelton Horsley gentlemen of the council.

Dr. Roshier W. Miller

Has been re-elected a member of the City School Board of Richmond.

Dr. Benjamin Carroll Henson,

Roda, Va., has been attending the Trudeau School of Tuberculosis, at Saranac Lake, N. Y., but will return home the first of July.

Dr. C. L. Bailey,

After practising for twenty-one years at Quinton, Va., has located at Sandston, Richmond, R. F. D. 3, Va.

Dr. H. T. Hopewell,

Strasburg, Va., who recently suffered a stroke of paralysis, has sufficiently recovered to be at his work again.

Dr. and Mrs. J. W. Holmes,

Pulaski, Va., have been on a visit to their son at Kenova, W. Va.

Miss Loula L. Odom, R. N.,

Superintendent of Sarah Leigh Hospital, Norfolk, Va., has been appointed by the Governor as a member of the State Examining Board for Nurses, succeeding Miss Elizabeth Harrison Webb, of Richmond. The appointment is for a term of four years.

Dr. E. T. Trice

Has returned to his home in Richmond, after a visit to Rochester, Minn.

Dr. C. W. Massie,

Of this city, who has been quite ill at St. Luke's Hospital, Richmond, is now much improved.

Dr. Harry B. Taylor,

A graduate of the Medical Department of the University of Virginia and president of the class of 1902, recently delivered an address in this city, on "Medical Missions in China." After graduating, Dr. Taylor spent several years in hospital training, following which he went to China as a medical missionary under the Episcopal church. He is in charge of St. James Hospital, Anking, China.

Appointments in National Guard of Virginia.

Dr. Herbert R. Drewry, Norfolk, who served as captain with the medical corps in the Twenty-ninth Division in France, has been made major and assigned to the medical corps of the 111th Field Artillery.

Dr. Harry M. White, of Fishersville, Va., who also served with the rank of captain in the Twenty-ninth Division, has been appointed major and assigned to the 116th Infantry.

Major Herbert R. Drewry and Captain Harry W. Boice, both of Norfolk, have been elected medical officers of the 111th Field Artillery, and Captain Walter E. Miler, also of Norfolk, Staff dentist.

Dr. R. H. Woolling,

Pulaski, Va., has recovered from a recent illness. He spent several weeks recuperating at his former home in Fluvanna County, Va.

Dr. W. T. Graham,

Richmond, has been appointed by Governor Trinkle as a member of the State Board of Health, to fill the vacancy caused by the death of Dr. McGuire Newton. Dr. Newton's work was with particular reference to children, and Dr. Graham will continue that line of work as a member of the Board.

Dr. John R. Blair,

For many years a resident of Church Hill, Richmond, has sold his home and will shortly move to Ginter Park, this city.

Dr. and Mrs. C. W. Astrop,

Of Surry, Va., were recent visitors near Fork Union, Va.

Dr. Robert Whitehead,

Meherrin, Va., who recently underwent an operation for appendicitis, returned to his

work in May, after spending sometime recuperating at his father's home in Amherst, Va.

Delegates to Social Workers' Conference.

Drs. R. L. Raiford, Sedley, and P. K. Graybill, Fincastle, were among the delegates appointed by the Governor to represent Virginia at the annual meeting of the National Conference of Social Workers in Washington, in May.

Experimental Laboratory Destroyed by Fire.

Fire of undetermined origin recently destroyed the new animal experimental laboratory on the estate of Dr. C. H. Mayo, three miles south of Rochester, Minn. The loss was estimated at \$150,000.

Dr. Paul E. Redd,

Of Richmond, recently paid a short visit to Mathews County, Va.

Dr. L. K. Leake,

East Leake, Va., has been elected a member of the board of directors of the State Bank of Goochland, which was recently organized in that County.

Elected Members of The Raven Society.

The middle of May, Dr. D. C. Smith, instructor of dermatology at the University of Virginia and the following students from the Department of Medicine were among those initiated as members of the Raven Society at the University: Frederic G. Dorwart, Newport News, Va., Luther W. Kelly, University, Va., Winston U. Rutledge, Anchorage, Ky., and John Powell Williams, Richmond, Va.

The Richmond Chapter, Alumni Medical College of Virginia,

At a meeting held recently, elected Dr. Manfred Call president, for the ensuing year; Elam C. Toone vice-president; Dr. Harry Bear secretary; and Dr. Frank S. Johns treasurer.

Dr. and Mrs. James Bordley,

Baltimore, Md., were recent visitors at the home of friends in Winchester, Va.

The Community Hospital

Will be opened at Greenville, N. C., September 1. It will be in charge of Dr. E. T. Dickinson, formerly in charge of Wilson (N. C.) Sanatorium. The last named institution was closed the first of June.

Crippled Children's Hospital at Shreveport.

The Shrine Hospital for Crippled Children,

at Shreveport, La., was dedicated in April. This was erected at a cost of \$300,000.

The N. C. Public Health Association,

At its annual meeting in Asheville recently, elected Dr. Charles W. Armstrong, of Salisbury, president, and re-elected Dr. Frank M. Register, of Raleigh, secretary.

Dr. G. F. Simpson,

Purcellville, Va., with a party of friends, motored to Harrisonburg, Va., and attended the Shriner's meeting held in that place on June 1.

Dr. Thomas M. Winn,

After a year's service at Physician's and Surgeon's Hospital, Wilmington, Delaware, has located at Millboro, Va. Dr. Winn, formerly of Palmyra, Va., graduated from the Medical College of Virginia last June.

Dr. W. B. Carr,

Recently of Warrenton, Va., has a position on a Fruit Boat between Brazil and New York City.

The Medical and Chirurgical Faculty of Maryland,

At a recent meeting, elected Dr. Philip Briscoe, of Mutual, Md., president, and Dr. Joseph A. Chatard, Baltimore, secretary.

Dr. Thomas A. Groover,

Associate professor of roentgenology at George Washington University Medical School, Washington, D. C., recently had his left hand and two fingers on his right hand amputated, owing to extended exposure to the roentgen rays.

Dr. Henry A. Christian,

Physician-in-chief at Peter Bent Brigham Hospital, Boston, by invitation, delivered an address before the Alumni Society of Randolph Macon College, Ashland, during commencement week, his subject being "Public Health Problems of Virginia." Dr. Christian is an alumnus of Randolph Macon College.

St. Luke's Hospital to be Enlarged.

The management of St. Luke's Hospital, Richmond, expects shortly to enlarge that institution and make a number of changes for the greater good of the hospital. To this end, the three residences just west of the hospital on Grace Street have been purchased.

Members of N. C. State Board of Health.

Drs. J. Howell Way, Waynesville, and A. J. Crowell, Charlotte, have been reappointed by the Governor as members of the N. C. State Board of Health for a period of six years.

Dr. C. B. Crute,

Farmville, Va., last month assisted in Powhatan County in holding chest clinics, under the auspices of the Tuberculosis Association.

Dr. Roy K. Flannagan,

Richmond, represented the Virginia State Health Department at the thirty-eighth annual conference of State and Provincial Health Authorities of North America, which convened in Washington, last month.

Dr. L. H. Apperson,

Who has been practicing roentgenology in Danville, Va., early this month moved to Petersburg, Va., where he is associated with Dr. Wright Clarkson in the same specialty.

Dr. Paul C. Brittle

Has moved from Conway, N. C., to Burlington, N. C. Dr. Brittle is a member of the class of '07, of the former University College of Medicine, Richmond.

Dr. J. Rainey Parker Honored.

Elon College, N. C., at its commencement this year, conferred upon Dr. J. Rainey Parker, Burlington, N. C., the honorary degree of LL. D., in recognition of the work he has done in Alamance County as a surgeon and citizen. He is head of the Rainey Hospital in Burlington and has been doing a big work there.

Dr. Parker has many friends among our readers as he was a former student in Richmond, having graduated from the University College of Medicine in 1901.

Dr. and Mrs. J. Allison Hodges,

Richmond, are leaving the middle of this month to attend the A. M. A. convention in San Francisco. They will be away for about five weeks during which time they will visit many places of interest in the West.

The Alonzo Myers Orthopedic Clinic, Inc.

Dr. Alonzo Myers announces the association with him in the practice of orthopedic surgery of Dr. J. Stuart Ganl, recently of Walter Reed General Hospital. They opened a clinic the middle of May, at 8 West Seventh Street.

Charlotte, N. C., which is known as The Alonzo Myers Orthopedic Clinic, Inc. This has complete departments of physiotherapy, brace making and fitting, and orthopedic equipment.

May Have Health Station for Mothers and Children in Virginia.

Representatives of the American Child Health Association recently spent several days at Charlottesville and the University of Virginia, in an inspection which may lead to the location of a demonstration station for health work among mothers and children. This Association, with headquarters in Washington, has already established two stations, and they propose to establish a third in the Southern States. Virginia is very anxious to have this one.

Roanoke Meeting, Medical Society of Virginia.

Under the heading of "State Society News," in this issue, we give information about the golf tournament to be held on the 16th of October, and also the names of Roanoke hotels, with their rates.

Begin now to make your plans to attend this meeting. The dates are October 16, 17, 18 and 19, a lovely season of the year, and the meeting promises many interesting features. To add to the success of the meeting, we want the interest and attendance of every member of the Society.

Hospital Buyer,

Which started publication last Fall, is devoted to all departments of hospital buying and should be of interest to those engaged in this work, as it conforms to the highest standards demanded.

The San Francisco Meeting.

If preparing to attend the American Medical Association in San Francisco, June 25-29, do not fail to carry your blue fellowship card. General headquarters, registration and information bureaus, all meetings and commercial exhibits will be in the Civic Auditorium. There will also be in this building a branch post-office, so, if you do not know where you will be stopping, you may arrange to have your mail sent you "Care the American Medical Association, Civic Auditorium, San Francisco, California."

Hydatidiform Mole.

A further study of hydatidiform mole has

been undertaken at this hospital, especially in regard to the frequency of malignancy following this condition. An attempt is being made to collect case reports from outside physicians. Cases reported by physicians will be greatly appreciated and the physician will be given due credit in any literature published.

Address communications to

ROBERT B. KENNEDY, M. D.,
Chicago Lying-in-Hospital,
Chicago, Ill.

The South Carolina Medical Association,

At its seventy-fifth annual meeting in Charleston, elected Dr. Leland O. Mauldin, Greenville, president, and re-elected Dr. E. A. Hines, Seneca, secretary-treasurer.

The American Laryngological, Rhinological and Otological Society,

At its annual meeting held last month, elected Dr. Hanau W. Loeb, St. Louis, president, and re-elected Dr. William H. Haskin, New York City, secretary.

Doctor!

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Obituary

Dr. William Beauregard Ashburn,

South Norfolk, Va., died at his home in that place May 17, at the age of 61 years. Dr. Ashburn studied medicine at the Medical College of Virginia, from which he graduated in 1889. He had been health officer for Berkley and South Norfolk as well as for a time physician to the county almshouse. At the time of his death he was physician to the relief association maintained in Berkley for the benefit of employees of the Virginia Railway and Power Company. Dr. Ashburn was a member of the Norfolk County Medical Society and of the Medical Society of Virginia. He is survived by his wife and two sons, one of them Dr. Horace G. Ashburn of South Norfolk.

Dr. Samuel Saunders, Jr.,

A former resident of this State, died in Binghamton, N. Y., May 8. He was 36 years of age and studied medicine at the University of Virginia, from which he graduated in 1915, at which time he was appointed an interne at University Hospital. Later he entered the U. S. Public Health Service and at the time of his death was a member of the staff of the Binghamton State Hospital. Dr. Saunders' death was due to a relapse following a severe attack of influenza. Within twelve hours after his death, his mother died at her home at University, Va., and the interment of mother and son occurred simultaneously in Washington, D. C.

Dr. Saunders is survived by his wife, formerly Miss Nan Harding, a graduate of the Training School at University Hospital, a small daughter, and two sisters.

Resolutions on Death of Dr. McGuire Newton.

The following was adopted at a meeting of

the Richmond Academy of Medicine and Surgery held on May 8, 1923:

Be it Resolved, That in the death of McGuire Newton, the Richmond Academy of Medicine and Surgery has lost one of its foremost members.

The profession of this city and State has lost its leading pediatrician; and the people a friend whose loyalty was sublime, and a citizen whose value was immeasurable; a unique character—wise, generous, fearless, rigidly honest; a man to whom the word "duty" was all but a religion.

He gave unstintingly of himself to the mothers and children of this community, and reaped a rich reward in undying affection and deep appreciation. He has left behind the memory of a life that all might do well to emulate; and his loss will long be keenly felt among us. *Be it further*

Resolved, That these resolutions be spread upon the minutes of this body, that a copy be sent to his family, and that they be published in the VIRGINIA MEDICAL MONTHLY.

J. G. NELSON,

W. L. PEPLE,

A. L. GRAY,

Committee.

The following resolutions were adopted at a meeting of the Medical Faculty of the Medical College of Virginia, Richmond, at a meeting held May 17, 1923:

WHEREAS, The Medical Faculty of the Medical College of Virginia has lost in the death of Doctor McGuire Newton one of its most valued and beloved members. Therefore, be it

RESOLVED, That we, the Medical Faculty of the Medical College of Virginia, feel with deep regret the death of our colleague and friend, Doctor McGuire Newton, whose long, efficient and faithful service to the College, to the children's wards of the hospitals and to the children of the city and State will be missed for years to come. His frank and true personality, his unfailing sense of duty, his great intelligence, his untiring endeavors, his loving kindness in his contact with his little patients and the confidence he instilled in the parents have made him one of the most beloved physicians that has ever lived in Richmond and will leave an enduring impression upon this whole section of the South. For these things and other sterling qualities, we shall miss him in our counsels, in our practice and among us as a friend and advisor. Therefore, be it further

RESOLVED, That in presenting these resolutions the Faculty extend to the family of Doctor McGuire Newton their heartfelt sympathy and that a copy of these resolutions be spread upon the minutes of the Faculty, sent to the daily press and published in the Bulletin of the Medical College and the VIRGINIA MEDICAL MONTHLY.

BEVERLEY R. TUCKER,

ROSHIER W. MILLER,

For Committee.



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OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Fifty-fourth Annual Meeting, Roanoke, October 16-19, 1923.

Vol 50, No. 4.
WHOLE No. 853.

RICHMOND, VA., JULY, 1923

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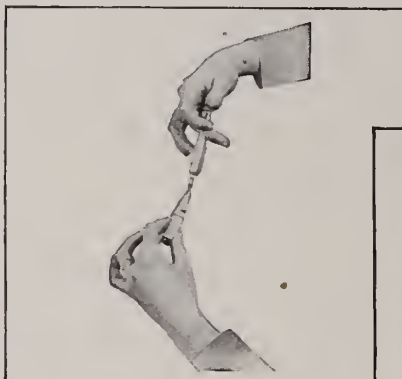
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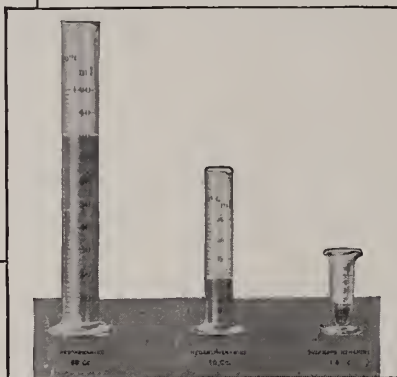
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Original Communications

ALLERGY IN ASTHMA AND HAYFEVER: A RESUME FOR THE PRACTITIONER.*

By RICHARD A. KERN, M. D., Philadelphia.

From the Medical Division of the Hospital of the University of Pennsylvania.

It has been estimated that allergy in some form or other occurs in ten per cent. of the white population of this country. Every tenth person is perhaps hypersensitive to some one or more foreign, usually protein substances, and is therefore a potential victim of asthma, hayfever, urticaria, angioneurotic edema or other allergic disease. The American Hayfever Prevention Association† has placed the number of hayfever sufferers in the United States at over one million. Here, then, is a group of conditions that because of its enormous prevalence commands the attention of every practitioner.

Our conceptions of asthma and allied conditions have undergone profound and fundamental changes in the past few years. Let me illustrate by referring briefly to the description of asthma as given in a well known textbook. In the 8th edition of Osler's Practice,‡ published in 1912, we read:

"As to the etiology, all writers agree that there is in a majority of cases of bronchial asthma a strong neurotic element. Many regard it as a neurosis. Of the numerous theories the following are most important: (1) Spasm of the bronchial muscles. (2) Swelling of the bronchial mucous membrane. (3) A special form of inflammation of the smaller bronchioles. Other theories which may be mentioned are that the attack depends on spasm of the diaphragm or a reflex spasm of all the inspiratory muscles." We read further: "One of its most striking pecu-

*Read before the Walter Reed Medical Society, September 15, 1922, at Smithfield, Va.

†Scheppegrell: Hayfever and Asthma, Phila. and New York, Lea and Febiger, 1922.

‡The Principles and Practice of Medicine: Sir William Osler, New York and London, 1922.

liarities is the bizarre and extraordinary variety of circumstances which at times induce a paroxysm. Among these local conditions, climate or atmosphere is more important. A person may be free in the city and invariably suffer from an attack when he goes into the country, or into a special part of the country. Breathing the air of a particular room or dusty atmosphere may bring on an attack. Odors, particularly of flowers and of hay, or emanations from animals, as the horse, dog, or cat, may at once cause an outbreak. Fright or violent emotion of any sort may bring on a paroxysm. Uterine and ovarian troubles may induce attacks in rare instances. Diet, too, has an important influence and in persons subject to the disease, severe paroxysms may be induced by overloading the stomach, or by taking certain articles of food. Many cases are associated with affections of the nose. Briefly stated, then, bronchial asthma is a neurotic affection, characterized by hyperemia and turgescence of the mucosa of the smaller bronchial tubes and a peculiar exudate of mucin. The attacks may be due to direct irritation of the bronchial mucosa or may be induced, reflexly, by irritation of the nasal mucosa, and indirectly, too, by reflex influences from stomach, intestines, or genital organs."

Contrast these vague speculations of the 8th edition with what we find in the 9th published two years ago: "Hayfever and Asthma: A reaction of anaphylactic nature in sensitized persons, in others possibly a reflex neurosis, characterized by swelling of the nasal or respiratory mucosa, increased secretion, and in asthma spasm of the bronchial muscles with dyspnoea. There are no essential differences between hayfever and asthma: in the one the nasal portion of the respiratory tract is affected, and in the other the bronchial, in many instances both."

Then follow two pages discussing the

various types of sensitization, and as for the possible reflex origin of the disease, there are only these few closing lines:

"Prior to the recent studies, this disease was regarded as reflexly following irritation in various localities: nose, stomach and bowels, etc., and the subjects were regarded as neurotic. Emotional disturbances as fright, apprehension, the smelling of an artificial rose in persons subject to 'rose cold' may cause attacks and it is difficult to bring such cases into the anaphylactic category. The prompt relief that sometimes follows the removal of irritation, for example, a polypus of the nose, support the view that this factor may prevail in cases not sensitive to animal or vegetable proteins."

You see, the chapter on asthma has been entirely rewritten.

Whenever our knowledge of a disease undergoes such a fundamental change, it is inevitable that there be a transition period of confusion. Much that is written is speculative and hypothetical, often exaggerated or even erroneous. It takes time and careful observations to correctly evaluate the various factors. Old ideas, that were unceremoniously discarded in the enthusiasm over the new, at times come back into their own, and assume a new significance. It took years to determine the true value of salvarsan, and that it had not displaced mercury. It is advisable, therefore, from time to time to review such fields of recent advance and to note that which a widened experience has firmly established. Such a survey in the domain of asthma and hayfever is perhaps not untimely.

Certain questions naturally present themselves: Are all cases of asthma due to sensitization? If not all, then what proportion of cases are due to this cause, and to what types of substances are they sensitive? How is sensitization to be determined? What of the role of what used to be called reflex causes, such as nasal conditions, gastro-intestinal and pelvic disorders: do they still play a part? What shall be the treatment of the cases, and what greater hopes can we hold out to our patients? These are the questions that are uppermost in the practitioner's mind and these I shall consider as fully as possible in the time available.

At the outset let me say that the discussion is confined to true bronchial asthma: an affec-

tion in which there is dyspnoea that tends to be more or less paroxysmal, with bronchial spasm that may be relieved by antispasmodics such as adrenalin; a condition in which the dyspnoea is not traceable to other causes, such as evident cardiac disease, either valvular, or the failing myocardium in patients with the high blood-pressure of arterio-sclerosis or nephritis; cases of mediastinal tumor; other forms of lung disease such as advanced stages of pneumoconiosis. It may seem unnecessary to state these diagnostic precautions, yet such cases are constantly being referred to asthma clinics for sensitization tests. For example, a man of fifty-nine was recently sent in for study of his so-called "asthma." The history was that he was a coal miner, twenty-nine years underground; that ten years ago he began having winter colds, worse recently, with dyspnoea induced by paroxysms of coughing, especially at night. On physical examination marked emphysema and a weak myocardium were found, and X-ray showed advanced pneumoconiosis. He had "miner's asthma," but certainly not bronchial asthma. A woman of forty had been treated six years for a supposed asthma. Physical examination showed slight thyroidal enlargement and a large substernal goitre, the removal of which effected a prompt cure.

INCIDENCE OF SENSITIZATION. Sensitization is by far the most important single cause. According to various observers from fifty to seventy per cent. of all cases give positive skin tests and clinical proof. Of the remainder it is probable that an increasing proportion will be found sensitive on more careful study, and as our knowledge of sensitizing substances increases. Cases that develop in childhood are practically all allergic; the proportion of positive skin tests gradually falls with a rising age of onset. Of patients developing asthma under twenty-five, fifty per cent. are found sensitive: under thirty, twenty-five per cent. Allergy very rarely manifests itself for the first time over the age of fifty.

TYPES OF ALLERGENS. The substances to which patients react may be divided into those which are *ingested* and those which are *inhaled*.

I. Ingested Allergens. Foods are far less commonly the cause of asthma than some of the earlier observers would have us believe, and more recent figures put the incidence well

under five per cent. Food-asthma is met with chiefly in early life, and even here it is not a predominant factor. Furthermore, the finding of a positive skin test is not sufficient to assign to that food a definite causal relation: in each case there must be clinical proof that exposure to the food in question will produce an attack, and that withdrawal of the food will improve the patient's condition. It is conceivable that a food, even though it causes a reaction when introduced into the skin, is rendered harmless on ingestion by the processes of digestion. The foods most commonly the cause of asthma are egg, milk and the cereals; then come shell fish and fruits. In the group of ingested substances may be placed drugs. As a rule, drug allergies appear in the form of urticaria or angioneurotic edema, involving the skin or gastro-intestinal mucosa, but in occasional cases drugs produce asthma.

II. *Inhaled Allergens.* Of far greater importance are the inhaled allergens. These may be classified as follows:

(1) Animal emanations. Most frequently to blame are hair or dandruff of horses and cats, and the feathers of chickens or geese. Rabbit hair is often used in pillows by the foreign-born in our cities. Occasional causes are duck, canary, and parrot feathers, dog and guinea-pig hair.

(2) Pollens. Forty per cent. of hayfever patients suffer from asthma during some portion of the season. The offending pollen varies with season and locality. In Virginia, the principal cause of spring hayfever and asthma (May 15 to June 30) is grass pollen, notably Kentucky blue grass, timothy, red-top and orchard grass. Minor causes are sheep sorrel, worm seed, horseweed, and in some localities the pollens of black willow, black walnut, red maple and the oaks. Fall hayfever and asthma (August 15th to October 15th) is almost wholly due to common ragweed, occasionally giant ragweed and marsh elder.

At this point let me call your attention to a fundamental principle of plant pollination, ignorance of which has led to many erroneous beliefs. All flowering plants fall into two groups, the wind-pollinated, and the insect-pollinated. Wind-pollinated plants have inconspicuous flowers that form a very profuse pollen of exceedingly small size—fifteen microns for ragweed. Such pollens have a

wide range of wind convection—a quarter to half a mile for the grasses and five miles or more for ragweed. Insect-pollinated plants on the other hand have bright colored, conspicuous, at times scented flowers to attract insects. Their pollen grains are large and heavy and their range of wind convection is at most a few feet. When it first became generally known that pollens bore a relation to hayfever and hayasthma, people began to observe what plants were in bloom during the season of illness. So in the fall suspicion at once fastened on goldenrod, while the inconspicuous ragweed was for years overlooked. It is quite true that roses, primroses, goldenrod and the like may be responsible for an occasional attack but it is only when the patient comes in direct contact with the flowers. For the overwhelming majority of cases the insect-pollinated plants have no significance. The importance of corn pollen as a cause of trouble has been emphasized by several writers. Here, it is true, we are dealing with a wind-pollinated plant, but its pollen grains are so large that they are not carried over a few hundred feet and only persons in close proximity to cornfields can be affected.

(3) Dust. This term covers a most important group of factors. Most asthmatics say that dust of any kind causes them trouble and it is easy to understand how in an asthmatic patient, at a time when there is bronchial infection and a congested mucosa, together with a "hair-trigger" vasomotor system, the inhaled dust acting simply as a mechanical irritant may precipitate an attack. It is, however, a significant fact that the dusts to which we are exposed are commonly of an organic nature. They contain varying amounts of protein and may, therefore, act as antigenic substances in producing a true sensitization. Commonly, then, we find that asthmatics are sensitive to a particular dust. This may be a dust to which they are exposed in their occupation. A baker may become sensitive to the proteins of wheat or rye flour, a tailor to sheep wool, jewel polishers and woodworkers become sensitive at times to wood dusts, and boxwood seems to be the commonest offender. Various face powders and toilet preparations, particularly those in which orris-root is an ingredient, may play a part. These are clearly defined specific dusts. But commonly the patient is sensitive to the dust of a particular room, usually the

bedroom. At times this may be traced to an ingredient of room dust derived from such substances as feathers, a wool rug, a grass rug, or wall paper. More often, however, we find sensitization to only "dust." Extracts of dust in these cases will give positive skin tests and avoidance of the particular dust gives the patient relief. These dust cases are extremely common. Cooke* has recently reported positive skin tests to a stock dust extract in over thirty per cent. of his cases. In my own experience I have found this to be true.

How do people become sensitive to dusts? It is an interesting fact that bedroom dusts are those most often concerned. It is also a matter of common observation that asthmatic patients date the onset of their trouble to an acute infection of the respiratory tract, and one is led to speculate as to a possible connection between these two. Influenza is often mentioned by patients as the starting point of their trouble. In others it is severe bronchitis, bronchopneumonia and in children whooping cough. These are all conditions in which there is present a considerable bronchiolitis. Lobar pneumonia, on the other hand, is rarely an antecedent of asthma. One must admit the probable tendency to sensitization in these individuals as evidenced by the commonly positive family history for allergic disease. But we do know that an inflamed mucosa is more permeable to foreign substances than a normal one. Egg albumin fed to an animal with enteritis will pass unchanged through the intestinal lining to the blood and can be found in the urine. It is conceivable, therefore, that in these cases of acute bronchial infection the inflamed mucosa offers a portal of entry for the sensitizing dose of a foreign protein. Since the patients are usually confined to their bedrooms during such illnesses, bedroom dusts should be the commonest offenders.

(4) Bacterial Sensitization. Much was written several years ago on sensitization of asthmatics to the proteins of the bacteria with which they were infected and skin tests were performed with bacterial extracts and suspensions. More recently, a number of observers have reported their failure to get positive reactions and it is probable that an actual sensitization in asthmatics to bacterial protein does not exist.

How shall we find out to what a patient is

sensitive? This is accomplished by a careful history and skin tests. There is no disease in which a detailed history is more essential than asthma, and I know of no type of history that is harder to take. We must go into every ramification of the patient's life, activities and surroundings. The significance of the age of onset has been referred to. Among the circumstances of the attack we must consider:

(a) *The nature of the attack.* This includes a description of its onset, duration and termination, its relation to cough or exertion. The more definite the paroxysmal nature of the attack, characterized at the onset with dyspnoea not induced by cough or exertion, the more likely is the case to be allergic.

(b) *Seasonal Variation.* Pollen cases obviously fall in this group, but we must also keep in mind the seasonal occurrence of certain foods, for example, strawberries. Many non-sensitive cases have also a seasonal variation usually being worse in winter, or in the early spring and late fall, at the times of transitional weather between warm and cold.

(c) *Time of day of the attack.* The attacks of dust asthma and those due to feathers are usually nocturnal. However, it is a fact that all asthmatics have more trouble at night.

(d) *Place of the attack.* Are the attacks limited to or distinctly worse in a particular room or locality? Has the patient ever experienced relief by leaving his house or neighborhood and going on a vacation or a visit?

(e) *Relation to food.* Has the patient ever noticed any relation between the taking of any particular food and the occurrence of the attacks? Here again we must guard against error; it is a common experience that asthmatic attacks are prone to follow a heavy meal, simply a matter of overfilling the stomach.

(f) *Exposure to animal emanations.* In this connection, it is not enough to take the patient's word as to contents of pillows, mattress or upholstery, but he should be required to submit specimens. An intelligent patient, a woman of forty-five, last winter consulted me because of asthma each winter for the past three years. She gave a history of asthmatic attacks fifteen years ago whenever she rode horseback and was forced to give up her horses on that account. Further questioning showed that her recent attacks have occurred only when occupying a certain apartment each winter. She brought a sample of the mat-

*Journal of Immunology, I, 147, March 1922.

tress stuffing which she had thought to be wool but which she found to be horsehair. The removal of the offending mattress of course gave prompt relief.

(g) *Occupational dusts.* This needs no explanation.

(h) *The effect of antispasmodics.* If adrenalin fails to give relief in an attack of dyspnoea, there is little likelihood of uncomplicated allergy.

The family history is of importance. Fully fifty per cent. of all asthmatics give a positive family history of allergy in some form or other. Thus, one person may be subject to hayfever, another has a food rash or is sensitive to drugs and the like.

SKIN TESTS. These are indispensable in the study of a case of asthma. The physician who expects to investigate many asthma cases must have in his possession suitable preparations of practically all substances that we know can cause asthma: their number mounts into the hundreds. And right here the practitioner is confronted by his greatest difficulty. He asks, "Is it worth my while to acquire all these substances for the comparatively few cases of asthma that I see?" and he promptly answers his question by "No." Experience has, however, shown us that the great majority of cases are due to a comparatively small number of substances. It is possible, therefore, to draw up a small list of proteins which it is worth every practitioner's while to acquire. With these he can test the patients and frequently arrive at a correct diagnosis. Only when he has failed in this is it necessary to refer his patients to someone more fully equipped. Of the foods he should have the following proteins; egg, milk, rice, wheat, corn, buckwheat, oat, rye, bean, pea, potato, strawberry, lamb, pork, beef. Of the animals emanations are necessary horse dander, chicken feather, goose feather, cat hair and dog hair. Orris root is also desirable. The above preparations can be obtained in powder form and retain their potency for a considerable time, at least a year. For Virginia the following pollen extracts are needed: Kentucky blue grass, timothy, red top, orchard grass, sheep sorrel, black willow, black walnut, common ragweed, giant ragweed, and marsh elder. These pollen preparations tend to deteriorate and should be renewed in the spring of each year. Room dust preparations for sensitiza-

tion tests may be prepared in the following manner: Sufficient dust is placed into a wide-mouthed two ounce bottle to fill it half way and enough fourteen per cent. alcohol added to just cover it. This is allowed to stand for three or four days being shaken vigorously two or three times a day. A drop of the resultant fluid is sufficient for a test. It has been the experience of the writer and others that when a particularly active dust solution is found it may be used routinely in the testing of other patients.

Tests may be performed by two methods—intracutaneous in which the substance in solution is injected into the skin, and cutaneous, in which the dry powder is placed upon a shallow cut or abrasion, usually on the flexor surface of the forearm, and the substance brought into solution by the addition of a drop of tenth normal sodium hydroxide (0.4 per cent.). In each case a positive reaction is characterized by an urticarial wheal, one-half centimeter or more in diameter, and a surrounding zone of erythema. The intracutaneous method is undoubtedly more delicate but it presents certain difficulties and dangers. The proteins to be tested must be in sterile solution and such solutions are not now commercially available. Furthermore, intracutaneous tests are sometimes followed by severe general reactions and only recently there was reported the death of a child three minutes after the test injection. The method, therefore, is only safe in the hands of those specially trained and the practitioner should content himself with the cutaneous method.

So much for sensitization: what of other etiologic factors? Second only to sensitization in importance is infection. Bronchial infection may itself cause asthma; repeated winter colds may prepare the soil for a dust sensitization. Infection sooner or later complicates all cases of asthma, whatever be their cause, and the prognosis in any case depends largely on the amount of permanent lung damage that infection has produced. Cases that begin as a seasonal pollen asthma are frequently prolonged into the fall and winter and finally become perennial because of superimposed infection. And the infection must be sought for throughout the whole respiratory tract, including the nasal sinuses and tonsils as well as the bronchi.

What of the so-called reflex causes? Cases

of gastro-intestinal origin are due to ingested substances and cannot be considered reflex. Rarely there are cases of pelvic origin and in these an endocrine disturbance must be suspected. Rose and Rolleston* recently reported the case of a woman in whom asthma developed promptly after the production of an artificial menopause with radium. Sensitization studies were negative and for a year all methods of treatment failed. Three days after the administration of ovarian and mammary extracts was begun the asthma ceased and after eleven months the patient was still free of symptoms. In a small number of asthmatics, nasal disorders, notably polypi and infection of the ethmoid sinuses, seem to be the only etiologic factor, the operative treatment of which is followed by a prompt and permanent cure. Unfortunately, these cases are very few, and it is the experience of everyone who sees many asthmatics to get a history of one or more futile nasal operations in nearly every case. For the rest, reflex causes have little significance. A patient with asthma due to sensitization has as a result an autonomic nervous system that yields more readily to stimulation than normally. Thus, excitement or an over-filled stomach may precipitate a paroxysm of asthma. The heightened nervous instability so common at the menses is quite sufficient to account for the greater frequency of asthmatic attacks in women patients at that time. Prevent exposure to the underlying sensitization factor—a pollen, feathers, etc., and the secondary reflex causes are inert.

TREATMENT may be considered under the headings specific and adjuvant.

Specific Treatment: At the outset it must be stated that by far the best results are obtained when the offending substance can be avoided. Active desensitization (or as Cooke has more aptly termed it, hyposensitization) is much less satisfactory, its results variable and as a rule not permanent. Foods can usually be avoided. At times, cooking renders the food inert. Patients mildly sensitive to one of the wheat proteins can take small quantities of toast without trouble. If an individual is sensitive to only the lactalbumin of milk and not to casein, the lactalbumin can be removed by boiling and skimming off the coagulated protein. If the food in question is a common article of diet, such as egg or

milk, then active desensitization must be attempted. This may be done by repeated subcutaneous injections of increasing amounts of the protein, or (and this is the method of choice) by the feeding of gradually increasing amounts. Thus, a child may be given a few drops a day of a cow milk solution sufficiently dilute so as not to cause a reaction. Each day the quantity and strength is increased until the child is able to take a fair amount of whole milk. Should any dose be followed by a reaction, the subsequent dose must be smaller. Such a patient must continue to take a given amount of the particular food every day in order to retain a state of diminished sensitization. The animal emanations are usually avoided; for example, feathers in pillows, animal pets and the like. There is one exception, namely horse emanation. Street dust may contain sufficient horse emanation to produce asthma in very sensitive individuals, and in such cases active desensitization is necessary. Fortunately, the results are usually good.

When a patient is sensitive to room dust, a complete change of his surroundings is advisable. He should use another room, preferably without floor covering and a complete change of bedding. Pillows, stuffed with silk floss or cotton are preferable to feathers. Such a change is commonly followed by prompt relief. This relief, unfortunately, is very often only temporary. After four or five months the patient has a return of asthma usually introduced by an acute respiratory infection and it is often found that he has become sensitive to the dust of his new surroundings; another change is then indicated. Attempts to desensitize by the injection of dust extracts have been made and with promising results. The method is, however, yet in the experimental stage.

In pollen cases the avoidance of the causative factor is practically impossible and desensitization must routinely be used. Patients are commonly sensitive to several of a group of related pollens. For instance, patients with early summer hayfever are usually sensitive to a number of the grasses. Under these circumstances one should select for treatment the pollen which gives the strongest skin reaction and is at the same time the commonest in the patient's surroundings. The grasses are biologically so closely related that desensi-

*British Medical Journal, 1, 12, January 7, 1922.

tization to one pollen offers considerable protection against the whole group. Prophylactic injections should be begun, preferably three months before the beginning of the season, and given at intervals of five to seven days, using the successive doses as outlined and recommended by the various biological products houses. The results of pollen injections are as a rule quite satisfactory in the early summer forms of hayfever and asthma, and the patients usually have complete relief. The autumnal form is, however, much more refractory. Only an occasional case experiences complete relief when treated with the usual commercial products. In the majority of instances, however, the disease is greatly ameliorated and less than ten per cent. experience no improvement at all. There remains considerable room for improvement in both the pollen preparations and our method of treating these autumnal cases. Pollen injections during the hayfever season should be given very cautiously and in small doses. An overdose may do considerable harm. No injections should be given during the season when the patient is free of symptoms. Desensitization must as a rule be carried out each year. In a small number of cases one or two series of treatments have succeeded in giving permanent relief.

A point that is commonly overlooked in the management of hayfever and hayasthma cases is the avoidance of exposure to large quantities of pollen. Patients should be told to keep down the weeds in their neighborhood. By a thoroughgoing antiweed campaign in the City of New Orleans, Scheppegegrell and his associates were able to reduce the incidence of spring hayfever by fifty per cent. In rural communities the difficulties are, of course, almost insurmountable.

Adjuvant Treatment. Of first importance is the treatment of infection. This includes the elimination of infected foci, such as sinuses and tonsils. An autogenous sputum vaccine in asthma or one prepared from the nasal secretions in hayfever is of great value. It is to be remembered, however, that the bacterial flora of the sputum often change and fresh vaccine must consequently be prepared from time to time.

Drugs. The time honored antispasmodics, belladonna, lobelia and stramonium, are of great value. Calcium lactate in doses of ten

to fifteen grains three times a day has proven efficacious in both asthma and hayfever. Much was hoped for from the recently introduced drug benzyl benzoate but unfortunately the results have not been very encouraging. Perhaps one case in thirty is strikingly benefited while the rest are not helped at all. Nevertheless it is worth a routine trial. Potassium iodide is indicated in practically all cases. To obtain the best results it should be given in small doses, not over five grains two or three times a day, and its use should be continued over long periods of time.

A change of climate helps in asthma as it does in tuberculosis, chiefly by its curative effect on secondary infection. A warm, dry equable climate at an altitude not over 3,000 feet is the most advisable, for example Southern New Mexico.

TREATMENT OF THE ATTACK. Here by far the most useful drug is adrenalin. It should be given early in the attack and doses of 2 to 4 minims of a 1 to 1,000 solution are quite adequate. The common mistake is to give too much, thereby producing disagreeable secondary after-effects. When patients administer the drug to themselves, ten to fifteen minims of a 1 to 10,000 solution should be used. It was formerly believed that the prolonged use of adrenalin gave rise to serious troubles such as arteriosclerosis. Clinical experience has shown, however, that this is not the case. Hoxie and Morris* have reported the case of a woman who for a period of six years had taken an average of 7 c.c. of adrenalin hypodermatically each day. The patient died suddenly and autopsy showed practically no vascular change.

The use of the various asthma powders and smoke inhalations is to be condemned. It is true these substances give temporary relief but their continued use results in additional bronchial irritation and only increases bronchial infection.

RESULTS OF TREATMENT. Do we cure asthma patients? If by cure is meant the rendering of the patient non-sensitive, then the answer must be "No." Sensitive patients will always develop asthma if exposed to the substance to which they are sensitive in sufficient concentration. We can, however, completely relieve the patient of his asthma if the sensitizing substance can be completely avoided and if no permanent lung damage has been done. And

*Endocrinology, IV, 47, 1920.

that for practical purposes constitutes a cure. The results of pollen and horse emanation desensitization have been referred to. In the non-sensitive cases and in those sensitization cases in which there is prolonged secondary infection, emphysema and resultant secondary myocardial weakness, the outlook is not good. It is important, therefore, that these cases be diagnosed and thoroughly studied as early as possible and this is the responsibility of the general practitioner.

906 *Medical Arts Building.*

LEPROSY—REVIEW AND REPORT OF A CASE.*

By DUDLEY C. SMITH, B. S., M. D., Charlottesville Va.

Instructor, Dermatology and Syphilology, University of Virginia.

The reasons for this review and report are mainly three in number. First, leprosy is a rare disease in Virginia. Second, increasing immigration may make it more common. It is a fact that at present leprosy does not begin in this climate, but it is entirely possible for the organism causing it to change its characteristics by evolutionary processes in such a way that it will attack persons in this climate. Third, during the last few years marked advances have been made in the treatment of leprosy.

CASE REPORT: Mr. O. K., whose address is 631 W. Main St., Charlottesville, Va., presented himself at the Out-Patient Department of the University of Virginia Hospital on September 2, 1921. He was admitted to the hospital for further observation. He had been admitted to the hospital on two occasions previously; March 9, 1916, and November 20, 1918. On these occasions his complaint was "rheumatism" and his diagnosis was syphilis. Following each admission he received a series of intravenous injections of arsphenamine with only very slight improvement. The records on both of these occasions give approximately the same data, except certain signs and symptoms were more marked on the latter admission.

Patient is a Syrian about fifty years of age, is single, was born in Syria, came to New York City about 1900, lived there a short time, then came to Virginia with his brother. They kept a small store and peddled their wares.

FAMILY HISTORY: Father and mother dead, died of old age, cause not known. Questioning gives no information as to the cause of their death. No sisters. One brother about five or six years younger, living, and in good health. He knows of no other members of family having trouble similar to his.

PAST HISTORY: Was a healthy child and young man. Does not remember having had any illnesses. Worked as "day laborer" until 1908, from which time patient dates his present illness. Has had headache since 1915; this is almost constant with paroxysmal increases. Hard indurated lumps began to appear on forehead at this time. These were not very tender. Has vertigo. Vision has been poor for several years. Some pain in eyes. Hearing has diminished in acuteness. Never any discharge. Lumps began to appear on ears in 1914. Began to have chronic cold in 1914; soon following this he had several attacks of nosebleed (fresh blood). Later the bleeding was less, but more constant, almost daily; blood was brownish with some flakes from nose. Rarely any sore throat, some hoarseness. No palpitation. No dyspnoea except in the attacks of pain. Some precordial pain which does not radiate. Feet, legs, arms, hands, and face have swollen for several years. No chronic cough, hemoptysis, night sweats, or loss of weight. Appetite and digestion good. No constipation. Urinates five to six times at night, this began about two years ago, amount passed each time is small, some difficulty starting stream. No hematuria. No incontinence. Denies venereal infections. No convulsions, memory good, sleeps well, for several years has had "girdle pains." Habits are not unusual, uses tobacco and coffee in moderate amounts, drinks very little, seems to have some idea of sanitation and infection.

PRESENT ILLNESS: Patient dates his present trouble since about 1908. At that time he began to have "rheumatism," thinks his joints swelled, he felt stiff and had much pain. Before this he had been in good health. The trouble began in his right arm, then involved his shoulder, left leg, right leg, and left arm in this order. Was confined to bed three weeks. Similar attacks have continued to present time except they have been of shorter duration. About 1915 he began to have darting and lancinating pains in arms, legs, abdomen, and chest. At times these were stinging in char-

*From the medical service, division of dermatology and syphilology, University of Virginia Hospital.

Read before semiannual meeting of Piedmont Medical Society, November 5, 1922.

acter, at other times burning sensations were severe. The "shooting" pains were worse in legs. In abdomen it feels as though some one grabbed him "in the stomach" and pulled and twisted. Does not vomit. About 1914 he noticed the appearance of nodules in the skin. These appeared in head, neck, arms and legs. These caused very few symptoms, nor were they tender. No ulceration. Patient says his feet feel dead. The skin on legs and arms is not as sensitive as normal, can strike or cut skin without pain. He has some trouble walking in the dark, legs feel stiff. The pains are worse in cold weather and at night. These are not affected by diet or exercise.

PHYSICAL EXAMINATION: Patient is a well nourished Syrian about fifty years of age. Answers questions slowly but seems to have average intelligence. Speaks English fairly well. Complains of frequent, shooting pains. He has leonine face. Fairly marked ragged alopecia of scalp and eyebrows. Almost entire skin is covered by maculopapular eruption. The eruption is "ham-colored" and splotchy. The areas are confluent. The thickness of the skin varies from slight to nodules from two to four centimeters in diameter, especially about the face. These nodules are intradermal, only slightly tender, are not painful, and are most prominent on the forehead and ears. On the arm just above the bend of the elbow is a round area four centimeters in diameter which is whitish and atrophic. There is a similar area three centimeters in diameter about the middle of the outer surface of the forearm. Most of the first phalanx of the right forefinger is absent, the patient says due to injury. There is marked diminution of senses of touch and pain over the body, which increase on extremities toward the hands and feet. Over the forearms, face and legs there is almost complete anaesthesia. Pupils contracted, are equal and normal, react to light and distance. There is mild conjunctivitis with some pustular discharge. Nose flattened, nodules in skin, and shows bloody scales in nares. Teeth poor. Small nodule the size of a pea on the tip of the tongue. Pharynx slightly congested. Tonsils enlarged and cryptic. Expansion of chest good and equal. Lungs clear. Heart not enlarged, no adventitious sounds. Abdomen normal. Penis normal. Left testicle atrophied. There are palpable lymph glands in the neck, axillae, ingui-

nal regions, and epitrochlear regions. Some of the glands are as large as a lima bean. They are smooth, rather hard, and discrete. The patella, Achilles, and triceps reflexes are absent. Babinski negative. Romberg moderately positive. The ulnar nerve is palpable in both arms.

LABORATORY FINDINGS: White cell count is 8,500; red cell count is 5,000,000; hemoglobin eighty per cent. Differential shows polymorphonuclears 60.5 per cent.; lymphocytes 29.3 per cent.; large mononuclears 4.4 per cent.; transitionals 2.4 per cent.; mast cells 0.8 per cent.; eosinophiles 2.6 per cent. Wassermann was strongly positive on several examinations. Blood pressure is a hundred and forty systolic and eighty diastolic, Phenolsulphonphthalein kidney functional test gave thirty-five per cent. excretion in the first hour. Spinal fluid examination normal. Urinalysis showed specific gravity of 1020, acid reaction, no sugar, a trace of albumin, a few hyaline and finely granular casts, no blood or pus. Acid fast bacilli corresponding to morphology of Bacilli leprae were found in nasal secretion, nodules in skin and venous blood. These were found in smears made directly from nasal secretion, venous blood and serum from nodules; in the case of venous blood, several cubic centimeters of blood were laked by adding to solution of acetic acid, the mixture centrifugalized and smears made from sediment (method used by Rivas.)

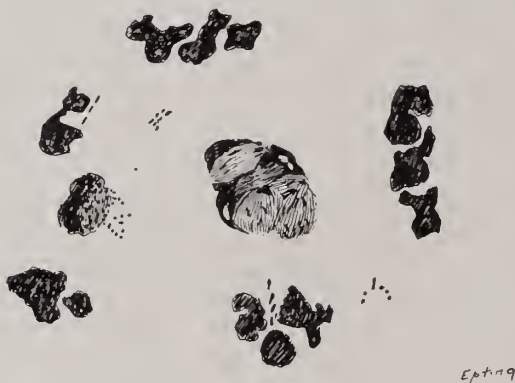
Diagnosis on last admission was *advanced maculopapular and anaesthetic leprosy*.

No claim is made to anything original in the following review, it is gathered from the accepted authorities. It is not even attempted to make a complete review of leprosy, this would require a monograph.

The cause of leprosy is generally recognized to be a slender acid-fast bacillus, very similar to the tubercle bacillus.

It was discovered by Hansen in 1871. It is very difficult to grow in culture media or in animals; in fact some claim that it has never been grown outside the human body. The arrangement of these bacilli in large plasma cells is characteristic, the protoplasm of the cell is packed with these bacilli and the bacilli are in bundles. These cells are called "lepra cells." The bacilli may also be found in lymph spaces. They invade practically any tissue of the body, but have a predilection for the skin and nerves.

Practically nothing is known in regard to the immune reaction. A positive Wassermann is present in about sixty per cent. of cases. The disease is most probably spread by contact. It is not known whether the contact is direct or indirect, evidence seems to point to direct contact transference. The blame is put on air, dust, water, food, insects, rodents, etc., without conclusive proof. The main factors in infection are: number and virulence of organisms; environment, including climate; and individual susceptibility. The latter may be either acquired or hereditary. A metabolic deficiency may be a factor in the individual susceptibility. Prolonged contact seems to be essential to transmission. Age has a bearing, the child or young adult being more suscep-



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Nasal smear, showing "lepra cell" filled with acid-fast bacilli.

tible. There are two males affected to one female. All races are susceptible. Most of the cases in this country occur in Louisiana, Minnesota, California, and Florida.

The incubation period is not definitely known, probably a few to several years. Granting that the patient whose case is here reported got his initial infection in his homeland and that the first evidence of the trouble was in 1908, the minimum time of incubation in his case is seven years. Both statements can be challenged, but are reasonable suppositions. The average length of incubation is stated as being two to three years.

The method of invasion is also unknown. The theories are that the bacillus enters the body through the skin; the mucous membrane of nose, pharynx, or bronchi; the gastrointestinal tract; or the generative organs. Most authorities feel that the nasal passages are the site of the initial lesion. The character of the primary lesion is not known, but it is known

that the bacilli multiply rapidly and are soon disseminated over the body, probably through the lymph and blood.

The lesions of leprosy are characterized by a particular type of granuloma. This granuloma shows mononuclear (lymphocytes, plasma cells and mast cells) infiltration usually about the blood vessels. The vessel walls are thickened. The infiltration replaces the normal elements of the tissue to a certain extent. Numerous bacilli are found in the lesion. A characteristic finding is the "lepra cells." Leprous tissue may change into scar tissue without ulceration, or ulceration may occur. Involvement has been found in practically all the tissues of the body. The bacilli within or near the nerves cause a neuritis with hyperesthesia at first, followed by degenerative changes in nerve fibers.

The stage of invasion usually presents prodromal symptoms. These vary in intensity and kind, sometimes few and mild, at other times more severe. This period varies from a few months to a year in length. A list of prodromal symptoms includes malaise, lassitude, chilliness, intermittent fever, mental depression, epistaxis, rhinitis, hoarseness, superficial and deep neuralgic pains, alteration in cutaneous sensibility, tingling, itching, burning, localized tenderness, numbness, stiffness, vertigo, and headache. A few or several of these symptoms may be present. In localities where leprosy is rare the diagnosis is rarely made in the early stages.

Three forms of leprosy are described; the tubercular or nodular, the anaesthetic, and a mixed type. In the first the skin is involved, and in the second the nerves. Most cases actually belong to the mixed type. In the tubercular form the first thing noted in the skin is patchy brownish-red or fawn colored maculopapular eruption on the exposed surfaces. The elevation of the skin may be very slight. The erythematous area may be from two to three centimeters in diameter. These may disappear and leave white spots, or there may develop definite nodules in the skin. The eruption sometimes becomes generalized. The nodules are seen frequently in the eyebrows, on the forehead, the alae of the nose, lobes of the ears, cheeks, back of the hands and on the feet. They vary from the size of a pea to a thickened area of skin several inches in diameter. The nodules may be generalized. The

nodules cause irregularities in the skin which on the face produce the leonine appearance. They may ulcerate. The subjective symptoms may consist of any of those mentioned under prodromal symptoms. There is often a generalized enlargement of lymphatic glands. These are moderately enlarged, elastic, and painless. The mucous membrane of the nose, mouth, pharynx, and larynx may be involved. There is usually some conjunctivitis, sometimes a keratitis and abnormalities in the deeper structures of the eyes.

In musculo-anaesthetic or nerve leprosy the bacilli cause changes in the nerves. At first there is irritation causing shooting pains, sensory, vasomotor, and motor disturbances. Later

cases that show both nodules and nerve leprosy. It may begin as either or both types.

The essential in prophylaxis is to prevent the bacilli being distributed from diseased individuals to those not infected. Complete isolation of lepers has proved a practical procedure in diminishing and ultimately exterminating the disease. Of course, a remedy that would quickly and efficiently destroy all the bacilli in an infected person would be a great aid to prevention of the disease. This goal has not been reached but several steps in that direction have been taken.

A malady as old as leprosy and with its characteristics has necessarily been treated in numerous ways. A list of drugs used in its



Photographs of patient taken in 1901 and 1921.

there occurs macular eruption. This may be red, pigmented, or light spots. The areas are sometimes several inches in diameter. The process progresses, the nerves become palpable, the skin becomes anaesthetic and the patient gets a paralysis of certain muscles. The nerves most commonly involved are the ulnar and peroneal. The paralysis produces the "claw hand." Reflexes are at first exaggerated, later they are diminished. Trophic lesions may occur in the tissues supplied by the affected nerve; this may go as far as actual loss of a portion of an extremity. It is characteristic of this type that the progress is slow.

The third, or mixed type, includes all the

treatment would be very long. Yet, in spite of the numerous remedies recommended, it has been considered practically a hopeless condition.

Most consideration has been placed on the segregation of those afflicted to prevent normal persons becoming infected. This alone has proved in several instances to be an efficient method of reducing the number of lepers. The reduction is slow, decades are required to free a country of the infection.

Proper treatment of the disease consists of general measures and medicinal treatment. The general measures employed are change in environment, hygienic surroundings, good

food, fresh air, freedom from mental worry, tonics, etc. It frequently happens that a patient shows marked improvement following admission to a leper colony when only general measures are used. Spontaneous recovery is said to occur occasionally. Surgical and other measures are taken advantage of when indicated. Leprasoria are necessary for the proper handling of lepers, both from a prophylaxis and treatment standpoint. The remedies recommended in treatment of leprosy include drugs, glandular extracts, vaccines, and serums. The agent which has stood the test of time and experience is chaulmoogra oil, or its derivatives. This oil contains substances which have a specific action on acid-fast organisms, especially the leprosy bacillus. Large amounts of the oil over long periods cannot be given on account of the gastric disturbance. The crude oil when given by intramuscular injections is very irritating. During the last few years it has been found that certain fractions of the oil contain the active principles. The unsaturated fatty acids, chaulmoogric and hydnocarpic, or some associated substances are the active bactericidal substances. The ethyl esters of these acids are recommended by McDonald and Dean; the sodium salt of these acids is used by Rogers. The ethyl esters are given in one to five cubic centimeter doses intramuscularly. The sodium salt is given intravenously in two grain doses after being dissolved in citrated salt solution. McDonald and Dean make the following statement: "The intramuscular injection of the ethyl esters of the fatty acids of chaulmoogra oil usually leads to a rapid improvement in the clinical symptoms of leprosy. In many cases the lesions disappear, except for scars and permanent injuries, and the leprosy bacillus can no longer be demonstrated." Rogers and others come to the same conclusion. Undoubtedly a marked advance has been made in the last few years in the treatment of leprosy.

PRELIMINARY NOTE ON A NEW THERAPEUTIC AGENT, THE THERAPEUTIC SWING.

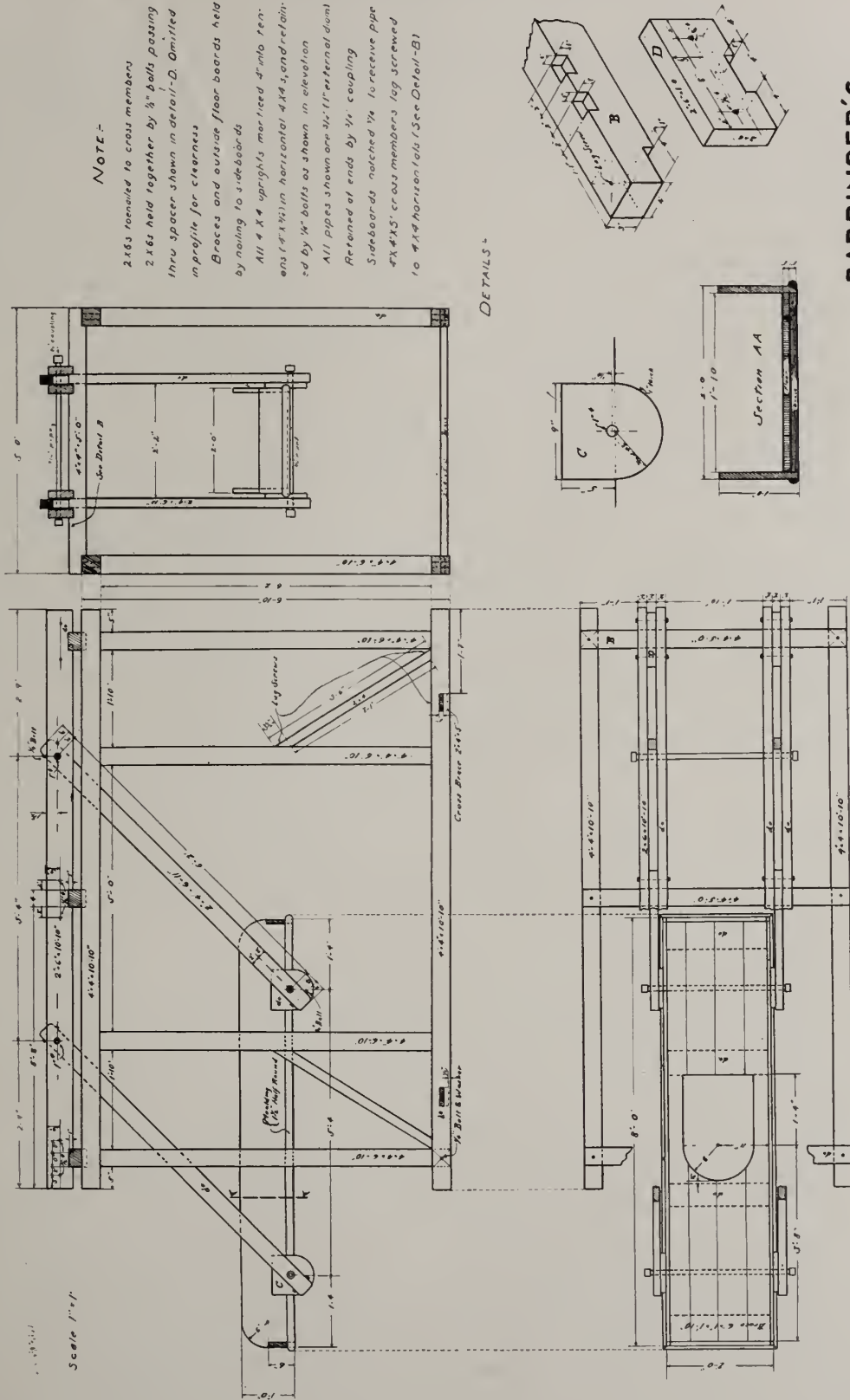
By P. B. BARRINGER, M. D., Charlottesville, Va.

Some ten years ago with a weight of 225, and height five feet, eight inches, the writer began to show periodic glycosuria. Always a trencherman, it was hard to quit old habits among which were midnight meals after the

midnight oil. With these attacks came distressing nightmare, not dreams but the old primitive night terrors, going back to the weary winged pterodactyle and the sabretoothed tiger snarling and snapping below. I soon found that sleeping on my belly stopped the nightmare and I in time assumed this sleeping posture habitually. In less than five years' time, with little or no medication and only a temporary change in diet, the sugar disappeared absolutely, but not until I had dropped to 169 in weight. Midnight mincepie is still a satisfying and soothing solace.

I began to wonder if this change in sugar toleration was due to decline in "obesity" or was it due to change in sleeping posture. I recalled that we were quadrupedal long before we were bipedal, that the natural sleeping posture of the child is also on its belly, that there must be a better visceral circulation when on the belly because then the "posterior" ligaments which carry the blood supply hang vertical and straight, just as they were evolved. Further, I had observed that many members of a wonderfully long-lived family slept that way. Moreover, there had been a steady fall in blood pressure, with my loss of weight, amounting to some 30 mm. in four years. As a working hypothesis I decided to assume that it was increased intra-abdominal pressure, pressure on the pancreas, sympathetics and vessels, that produced my trouble. When lying on the back, obesity, heavy meals, too much water in the stomach and even gastric gas all give an increased pressure on pancreas, etc., while if on the belly only the latter oppressed. This was my case.

I had the Taylor Instrument Company, Rochester, N. Y., make me a special U-tube manometer, mercury or water, zero in the middle, sliding scale, etc. With Y-tube, bulb pump, connected manometer and long rectal tube I in turn tried many experiments, but one must suffice here. With a large soft rubber "condom" slipped over the terminal end of a rectal tube tie firmly in place. Pump this condom up until $1\frac{1}{2}$ or 2 inches in diameter. Read the manometer and it will be about 10 mm. plus. Open, let condom become flaccid, oil, and introduce as high in rectum as possible, then very slowly pump up to 10 mm. Very variable manifestations appear, but in a few minutes a subconscious mechanism will adjust the abdominal muscles and the mercury



NOTE:-

2x6s nailed to cross members
2x6s held together by 1/2" bolts passing
thru spacer shown in detail-D. Omitted
in profile for clearness
Braces and outside floor boards held
by nailing to sideboards
All 4x4 uprights morticed 4" into rear
ends 4x4 1/2" in horizontal 4x4s, and retain-
ed by 1/2" bolts as shown in elevation
All pipes shown are 1/2"-11" external diam
Retained at ends by 3/4" coupling
Sideboards notched 1/4" to receive pipe
4x4x3' cross members leg screwed
to 4x4 horizontal (See Detail-B)

DETAILS:-

BARRINGER'S
THERAPEUTIC SWING

will come to rest somewhere—say about 12 mm. plus. The subject is on his right side, loosen scale and slide it until the zero is brought to the level of the mercury as it stands. Now make patient stand up and we read about 40 mm., the measure of the bipedal burden borne daily. A good husky laborer can blow this mercury “over the top” on demand, few women can. (Is this one of the causes of feminine constipation?) Now put patient on all-fours, after a time, negative, again depending on tone. Now put him in a knee-chest posture and an invariable negative. Now put him in the quadrupedal sleeping posture, which I found so valuable and have so long used, and nearly always negative. A gas-laden gut gives plus anyway you fix it but in this posture the average man, not too fat, gives a negative. The posture is as follows:

On a fairly firm, level bed extend the body prone, flex the left lower leg, and then draw up this thigh to a right angle, with the weight on left knee, tilting pelvis to the right. Next, draw right elbow down under the thorax, flexing forearm until palm of the right hand rests against manubrium. Then draw the left elbow down until at right angles with the body, tilting shoulder girdle also to the right. Fat men may find that a pillow under the left elbow helps at first.

This is a good and comfortable posture of rest, many more people sleep that way now than one would think and all of us once could sleep that way easily. It is primitive, infantile, but we would be better off had we not turned our backs on mother earth too soon.

With an apparent explanation for the benefits accruing from sleeping on the belly, I began to wonder what more belly rest would do for any one. Would a daily seance with the belly hanging free help? To this end I had built a wooden cot, 2x8 feet, with a hole 18x24 inches to receive the belly, and tried it. Sleep on such a device is an impossibility and resting is a mere matter of vigor. The hole seemed too large and even when adjusted to comfort you could not approach sleep. But a most interesting observation followed. Lying prone on the “big hole” gives a natural posture for trying one’s pulse and I was soon struck with the fact that pronounced changes in rhythm, and particularly pressure, took place when the belly hung free. Turning over, and dropping my lowered back through the hole, brought no

such results. I tested it often and it was as certain as things physiological can be.

Pondering these facts, I determined to see what increasing the gravitational pull by swinging the patient would do, shortening the time. I then had built a strong frame from which I suspended my cot by four equal rods of about 7 feet radius, and then tried it without a “sphyg.” But a man can’t trust his finger or take his own pressure, so I asked two colleagues to come out and test the machine, predicting to them the result. From notes of the time I read as follows:

	Age	Wt.	Before swinging	After swinging
Dr. H. T. M.	42	150	125-70	110-65
Dr. M. L. R.	40	185	118-65	108-60

Each of these gentlemen took the other’s reading on a good mercurial manometer and read closely. Dr. M’s systolic fall was 15 mm. on eighty swings, and Dr. R’s was 10 mm. with 5 mm. each diastolic. As the swing was rough and poorly padded, I swing Dr. R. only 75 times, nearly four minutes. This double result was interesting but I had no idea of its real import until, trying their pressures four hours later, we found no rise at all with a slightly lower diastolic.

As these were men approaching middle age, and of professional habits of life, I determined to try it out first, as a physiological problem on youth and the vigor of athletic training. I got out a number of students and internes. One fell 18 mm. in five minutes and all but one fell some. He, about 25 years of age, was hard and thin. From all forms of tests I am convinced that to get a pressure response one must have a real “belly,” that is one you can see, with weight enough in the abdominal wall, or loose inside, to feel the gravitational and centrifugal pull of the swing. Fortunately, most patients of this class have such bellies and I have learned to make them where needed (1) by drink water or enemata, (2) by attaching weights, by suction, to the ventral face, and (3) by relaxing with dry or moist heat.

I then tried to find a patient of high tension, with still good vessels and such good general health as to give no risk. This theoretical ideal was never found but a near approach is here given: Mrs. R., age 65, weight 170, height 5 feet, 6 inches, married with seven children, six living in good health. On arrival, systolic 255 mm. Her family physician re-

ported "running from 250-260." Face splotted and turgid, much dizziness and extreme constipation. Vessels seemed sound but as she had had a "leg-arm" paralysis some four years ago from which not fully recovered, they were risky. One or more severe attacks of epistaxis. No albumen, no sugar, nocturnal urine 360-400, specific gravity 1025-1030. Family history diabetic, father and brother. I decided to handle her as if made of glass.

For blood pressure results a seven foot swing gives a physiological response in six minutes or 120 swings. By a full physiological response I mean that the average person, of fair weight of belly and a normal pressure, will give all the fall at the end of this period that you could safely exact, say 5-10 mm. diastolic and 10-20 mm. systolic. Now let us see what does this? Theoretically, a 7 foot swing has 14 feet of horizontal traverse and 18 in vertical. In practice this is cut down to 10 feet horizontal and 12 in vertical. Forty times a minute, with this traverse, you start and stop and rise and fall with your abdominal viscera shooting back and forth like a shuttle in a loom. Every movement throws blood towards the splanchnic area and the valves of the veins check its return, except for the head. Moreover, it is a "force pump" as each blood vessel, for each viscus now hangs vertical, big end up, and it holds what it gets, while the lower viscera are also free from that 40 mm. pressure found in the rectum when standing. Even intra-capillary conditions favor filling the "splanchnic lake."

Having gotten these facts from the safe and sound, I felt justified in starting this patient with twenty swings of low vertical. Invoking the saints of gravitation, I put her in. As a posterior bearing I pad the ant-sup-spinous processes of the illium (pubes free) while anteriorly she was padded under the sternum and the elbows and forearms drawn far back against the sides. Well padded everywhere we buckle a canvas cover over her. This is imperative as they may slide, get scared and try to jump out. With a rope attached to the front of the cot I swung her gently 20 times, largely to get confidence, etc. From notes of the time I read as follows: Second day two periods 50 each, not over 10 inches, third day 75 each, 10 inches, said she was "surprised how much better she felt," fourth day 100 morning and evening, 12 inches. Face no longer turgid

but now soft and elastic, pronounced tingling face, neck and mammae as the pressure subsides. At the end of the first week systolic 210 mm. and diastolic 105 mm. Without drugs or enemata bowels have begun to move, can walk upstairs without balustrade, can take off a ring not removable in years, lost one pound and "wonderfully better." Now looks quite pallid showing color on arrival due to superficial blood. To make a long story short, she had to leave at end of month when she had a systolic of 185 mm. and a diastolic of 90 mm. The last week I gave 120 swings twice a day, "hitting the ceiling," and this with rectum and stomach both full of water. Color now fine, bowels regular, almost free, walking 400 yards twice a day. I advise exercise as a vessel built up to stand high pressure is safe on a 40 mm. drop and will soften without work. Today, about 15 months after leaving me, while her tension is climbing back to where it was, she is vastly improved, works, eats and sleeps well, cheerful and hopeful. Bowels as regular as when she left, one or more actions daily.

There are 1,000 cases of constipation for each hypertensee, and I was much impressed with the marked improvement in a colon you could trace, from end to end, in a fleshy woman through the abdominal wall, the marked improvement, at the end, in haemoglobin content and the whole change in mental status. I am persuaded that it will excite every function in this seemingly hopeless cavity if kept up long enough. I now use water only in the rectum, and it is its weight that counts. The heavy liver, at the other end, is all that is needed. Between these two we can knead the dough and splash the splanchnic lake.

Several times I have thought I knew how this machine worked. Today I am uncertain. For instance if a "swing" is made with the radius pivoted below, with the arc of traverse above, it aids constipation but does not influence blood pressure. One can not say why. The fall in blood pressure is often so sudden that it appears to be a vasomotor. For instance, when a large party of medical friends were at my house, we found one with high tension (190), and as a demonstration I reduced this case 15 mm. in less than one minute. As he had just had supper I was afraid to try more. In considering a vasomotor fall we must recall that while there is a vasoconstrictor center in the medulla, the analogous dilator

center is not there. The vasodilator ganglia all seem to be in the abdominal cavity and most abundant on the inferior face of the diaphragm. Repeated visceral impact on this inviolate region might give such a result at once. But the slow and consistent improvement always seen in abdominal power must be due to vascular changes from other causes. Systematic and regular engorgement of the abdominal vessels would be expected to promote just such changes.

I always advise the prone sleeping-posture, already given, for all patients using the swing, although it need not be limited to them. It seems to prolong the swing action. As we have seen the body weight in this posture is borne chiefly by the pelvic and shoulder girdles, the strong lumbo-dorsal spine easily carrying the weight between. The viscera hang well nigh vertical, although the belly spreads out somewhat to the left. In many people the belly hangs free from the umbilicus back to the pubes and this gives a grateful rest to the biped's weak spot, the lower abdominal area.

This machine, starting in the mental recreation of a retired physiologist, has reached a practical turn little expected. It opens an almost unlimited field for further study. I am anxious that my colleagues in Virginia should take up this work and I come to this journal for this purpose. I will gladly show my machine and its results to all who come but I would advise a careful testing of longer radii. Perhaps you should learn the short before experimenting with a more potent form. To this end I will gladly furnish free, to a few interested internal men, the blue prints for the present machine. It has one great fault: it takes a house to house it. With gross dimensions some 11x8x5 feet, it practically requires a room at least 25x12. The floor on which it is placed must be strong. A patient weighing, say 200 pounds, and we are treating a heavy class, when moving at nearly 500 feet per minute, is not quite safe on flimsy apparatus. I am convinced that no one will ever have more than one accident with the same patient. When properly made and handled "it runs as easy as a rocking-chair" and it gives results. It would be an ideal addition to the armamentarium medicum of any institution.

At present I can only suggest this classification as a guide for its use:

(1) Abdominal muscles can be given "set-

ting up exercises," light and heavy "duty work" at will. It is really good here.

(2) Constipation can be influenced both by improving digestive power as well as nervous and muscular tone.

(3) Anemias, of a feculent type, improve rapidly, possibly others, as it alters temporarily circulation in viscera, bones, etc.

(4) Hypertension, if carefully and gradually approached, can be much reduced for considerable periods and in some cases perhaps permanently. Even when lowered temporarily it causes a most marked improvement in general health.

Of course I would suggest that, after the experimental stage is past, we should use with it all other hygienic and therapeutic agents which are found to act synergistically. As an example, bran, taken as a breakfast food, is almost a purgative when used during heavy swinging while fruit salts act as usual. In short the Therapeutic Swing is offered as an agent giving a new line of approach, whose limitations and possibilities have yet to be very largely worked out by critical experimentation.

CASE OF DIVISION OF POSTERIOR SENSORY ROOT OF GASSERIAN GANGLION FOR TRIFACIAL NEURALGIA.*

By M. D'ARCY MAGEE, M. D., Washington, D. C.

I feel a hesitancy in presenting to this society the result of one attempt at the division of the sensory root of the gasserian ganglion, realizing the larger scope and experience of many present; but, since the subject grows daily in importance, I regard it timely to bring before you the progress made by neurological surgery for the relief and radical cure of trigeminal neuralgia.

Neuralgia, as such, is described by one author (Starr) as a disease of a sensory nerve characterized by pain in the course of the nerve or its peripheral distribution. Surgeons have cut out both nerves and ganglia for relief of neuralgia, and much information has been obtained as to its pathology. All the various processes of neuritis with degeneration and atrophy have been seen. The most important lesions appear to be in the neurone bodies which lie in the ganglia: these undergo stages of degeneration such as chromatolysis, vacuolation and atrophy.

The connective tissues about the neurone

*Read before Medical Society of District of Columbia, November 22, 1922.

bodies are found to be increased in density. The small blood vessels in the ganglia are sometimes closed and all forms of atheroma or sclerosis have been seen in the large vessels. (Keen and Spiller). While these changes are characteristics of chronic and long-standing cases of neuralgia, but not especially in acute and transient cases, they are, however, indications of a long continued malnutrition.

The causes of neuralgia in general are due to toxic agents of external or internal origin, causing an irritation of the neurones or of their axones; it may be caused by congestion without or within a serous exudation in the sheath of the nerve and consequent compression and irritation of the nerve fibres. Many cases of neuritis are preceded by neuralgia. It is not uncommon to be due to pressure from without, as tumors or bone formations, or by disorder of nutrition, gastro-intestinal diseases, infections, diabetes, anemia, malaria, syphilis, and lead poisoning.

ETIOLOGY—The pathogenesis of trigeminal neuralgia is not uniform. Excluding primary or secondary involvement of the ganglion by malignant tumor, there are a number of instances of genuine major neuralgia in which demonstrable lesions of the ganglion or its divisions have been conspicuous by their absence. On the other hand, certain cellular changes have been found in the ganglion of patients suffering from *tic douloureux*, while precisely the same changes have been found when *tic douloureux* did not exist. (Caminiti). The disease may be of central origin, that is from a lesion in the pons, in the sensory root, or in the ganglion itself; the ganglion may be involved primarily or secondarily to diseases of the peripheral branches. In a word, there remains to be found a lesion, either central or peripheral, which is either constant or characteristic. This view is held by authorities, as Spiller, Hutchinson, and Krause. Women are more frequently affected than men. Age has no exemption. Majority of cases occur in middle life. Heredity plays a part, although some authors differ on this point. During Fall or Winter are seen greatest number of cases, and climates of low damp localities are prolific sources: neurasthenic types with gouty antecedents and diabetes are also among many of its victims.

The early surgical measures employed to meet cases of major neuralgia were confined to

the peripheral filaments and intracranial ganglion of the fifth nerve, such as neurectomy excision, and evulsion of one or all three of the divisions; likewise in 1903 Schlosser, of Munich, described injecting the branches of the trigeminus with alcohol within their exit from the cranium. He had tried injections at the supra-orbital, infra-orbital, and middle foramina and thinking that he would be more successful if the nerve trunks could be reached, central to their important branches, he devised a method of injecting the third branch at the foramen ovale, the second at the foramen rotundum, and the lacrimal and the frontal branches of the first as they enter the orbit at the sphenoidal fissure. His technique was simplified by Levy and Baudouin and their modification has been used with success by Harris in England, and was introduced in this country by Patrick. The method of Levy and Baudouin has been tested by many operators in all parts of the world, and there can be no doubt of its value (page 341, Vol. IV, Billings' *Forchheimer*).

In inveterate neuralgia of one or two of the branches of the trigeminal nerves, a peripheral operation may cure the case but seldom does. It often gives relief, perhaps a few months or sometimes a few years, but invariably returns. All such methods seem to fail as a permanent cure, and bring us to consider the intracranial method of attack.

In 1884 Mears, of Philadelphia, suggested the removal of the gasserian ganglion as a cure. Horsley was experimenting on lower animals, the feasibility of such a suggestion, and in 1890 William Rose, a pupil of Horsley attacked the ganglion of a patient by removing the upper jaw and drilling through the base of the skull at the foramen ovale, and succeeded in removing the second and third division of the ganglia. In 1891 Horsley approached from the side of the skull, opened the dura, lifted the temporal lobes and severed the posterior sensory root near pons. Patient died, never regaining consciousness, although it had been successfully performed on lower animals.¹

Andrews, of Chicago, among others, exposed and excised the ganglion through pterygoid fossa. These radical operative steps were followed by extremely high mortality. Two years later Hartley and Krause advocated an osteoplastic flap in front of the ear exposing the dura, known as the high temporal operation, in

contradistinction to a later method proposed by Cushing, in which the line of incision was somewhat lower. The gasserian ganglion was excised, evulsed and pulled out but, owing to the danger from hemorrhage and too much trauma, was abandoned.

In 1898, after careful histopathological studies of the ganglia removed from cases of trigeminal neuralgia, and after animal experimentation combined with histological studies, Spiller proposed simple division of the sensory root for the relief of the pain. Frazier carried out this idea and, in conjunction with Spiller, was able to show conclusively from an experimental and clinical standpoint that regeneration of a completely divided sensory root never occurs. In spite of this fact it is only within the past few years that simple division of the sensory root has been generally adopted. Even at the present time, avulsion of the root, instead of a clean division by the scalpel is sometimes done.

Frazier, in 1903, at the suggestion of Spiller, began to cut the sensory root in preference to removal of the ganglion which, with additional refinement of technique, is the accepted operation in the United States, assuring permanency and having the lowest mortality. In reply to a recent letter seeking information in regard to the results of radical operation of trigeminal neuralgia, he states, "In some 315 operations, I have been called upon to reoperate three times. We have lost one case in these 315 operations; in 121 consecutive cases we have had no deaths. Of course, as you know from your knowledge of physiology of the sensory root, there can be no regeneration after the root has been severed so that the operation is in every way a radical one in its effects."

Adson, of Mayo Clinic, in a recent article in the September number of *Surgery, Gynecology and Obstetrics*, under heading of preservation of the motor root of the gasserian ganglion, describes the technique employed since last March in nine consecutive cases, exposing the ganglion through an oblique incision of the skin; temporal fascia and temporal muscle situated 1 c.c. in front of the ear and extending upward and backward from the zygoma for 7 c.c.; this is followed by a decompression opening in the skull which is about 3 c.c. in diameter, after which the dura is elevated, the middle meningeal is ligated, the third branch identified and dissection carried upward, ele-

vating the dura from the arachnoid which is attached to the ganglion until pulsation can be

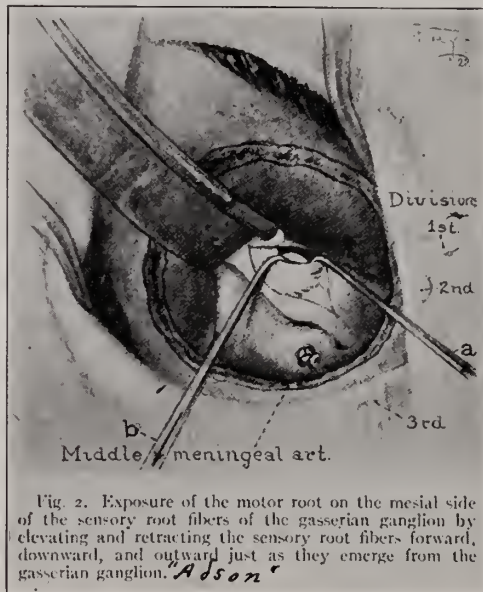


Fig. 1.

seen above the ganglion. (Fig. 1). The arachnoid is then opened exposing all sensory root fibres and the outer part of the ganglion. After bleeding is controlled, the retractor exposes the posterior margin of the ganglion, along with the sensory root; a small dissecting hook, placing it over the small root fibres, is retracted gently downward and forward, elevating the ganglion on the mesial side. Hook B catches the mesial side of the sensory root and is elevated by retractions downward and upward to expose the motor root lying in a fasciculus underneath and independent of the sensory fibres, as will be shown on a slide. The sensory roots are divided and the motor tract recognized first as to its location, again by having a distinct sheath apart from sensory bundle of fibres. In a recent letter from Dr. Adson relative to the result of operations of trigeminal neuralgia, he informs me that "In two hundred and eight patients operated upon for trifacial neuralgia, there were two who suffered a return of pain, and these two cases were not true recurrences but the result of failure to resect all of the root, which operations were performed during my first year of experience in this type of surgery. I hardly feel that the word 'recurrence' can be used in connection with this disease for when once the root is divided it never regenerates, and the return

of pain must be caused by the failure on the part of the surgeon to divide all of the fibres. These patients in whom the pain returned were among the cases operated when the old technique was followed, in which a headlight was used. Since adopting the illuminated retractor, however, I am able to see all of the fibres and we have not had any cases of patients returning complaining of pain. We have also perfected the preservation of the motor root."

At present, approach to the ganglion and sensory root is made through the temporal bone at the level suggested by Cushing and Lexer. The incision used by the authors is a longitudinal one extending upward for about three inches from the preglennoid tubercle on the zygoma. A simple trephine opening is made through the squamous portion of the temporal bone, and the opening enlarged with bone-biting forceps. The method of making a large flap of muscle periosteum and the bone is quite unnecessary, since the longitudinal incision obviates injury to the temporal branch of the facial nerve and assures a disappearing scar in the hair line. The operative opening is enlarged downward as far as possible rather than upward, as the field is better exposed thereby and less retraction of the temporal lobe of the cerebrum is necessary. Upon raising the dura mater by sponge dissection from the floor of the middle cranial fossa, it may become necessary to identify several landmarks. These are (1) the foramen spinosum, through which the middle meningeal artery enters the cranial cavity; (2) the foramina ovale and rotundum containing the mandibular and maxillary divisions of the trigeminal nerve; and (3) the gasserian ganglion with its sensory root.

In a few operative cases I witnessed, and one I performed, the grayish pink color of the sensory fibre was in contrast to the white glistening fibres of the motor tract. Frazier uses faradization in determining the complete severance of the sensory root.

In the March number of *Surgery, Gynecology and Obstetrics*, Kanavel and Loyal E. Davis, of Chicago, have given some valuable data as to the topographical anatomy, which I will take a few minutes of your time to describe.

The anatomical landmarks are of invaluable aid to the successful operator. The principal landmarks, as stated before, are (1) the preglennoid tubercle of the zygoma about 1 c.c. from the external auditory canal; (2) the foramen

spinosum through which the middle meningeal artery enters the cranial cavity; (3) the foramen ovale and rotundum containing the mandibular and maxillary division of the trigeminal nerve; (4) the gasserian ganglion.

In a hundred skulls examined, the average distance from the internal surface of the squamous portion of the temporal bone opposite the preglennoid tubercle to the foramen spinosa is 2.47 c.c., the minimum distance is 1.9 c.c. and the maximum distance 3.4 c.c. The foramen spinosa in four per cent was continuous with the foramen ovale.

Anatomical specimen of the temporal bone, which I shall exhibit later, shows the foramen spinosum within the squamous portion of the temporal bone at its articulation with the great wing of the sphenoid. This anomaly is well to note since the foramen spinosum is usually found in the great wing of the sphenoid and to the sphenosquamous articulations the dura is more adherent, and such a diversity could confuse the operator. Again marked grooves running anterior-posteriorly are present. These depressions of such depth caused by cerebral convolutions of the temporal lobe are readily mistaken for the true operative field and serve



Fig. 2. Showing incision used by the author.

as attachments to the dura. The middle meningeal artery divides as it leaves the foramen (Fig. 2) into six distinct variations, the larger percentage gives off single anterior and posterior branches. (This is a valuable point in approaching the meningeal artery at its root). Furthermore, there is the bony prominence overlying the foramen spinosum just anterior to it, found in 41 per cent of the cases,

which makes it difficult in tying the middle meningeal at its base. The distance from the foramen spinosum to the gasserian ganglion in 40 skulls examined is 1.66 c.c. at an angle of 20 degrees occipital from transverse diameter through the foramen spinosum. The foramen ovale is 0.7 c.c. at an angle of 30 degrees frontal from the transverse diameter and the foramen rotundum 2.27 c.c. at an angle of 36 degrees frontal from transverse.

With anatomical points anticipated, the safety and speed of an operation is assured. The danger of this operation is hemorrhage, which may be venous or arterial. The venous hemorrhage occurring in the field of operation from the middle meningeal plexus can be controlled by use of small cotton sponges (small

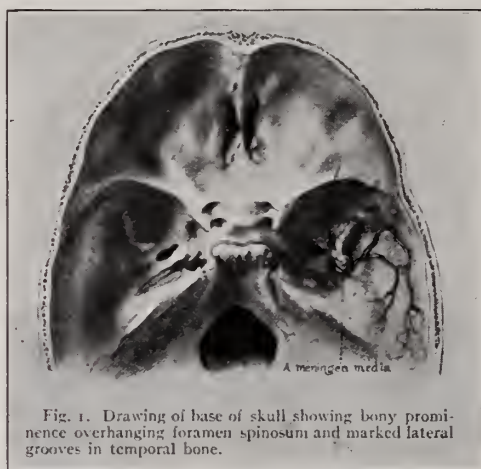


Fig. 3.

dental cotton sponges) or small strips of gauze. In lifting the dura, the petrosal sinus can be injured, or when cutting the posterior sensory root of the ganglion, there may be injury to the cavernous sinus. Arterial hemorrhage can be controlled by ligating the middle meningeal artery and with due regard to a contributory branch found coming through the foramen ovale. Most operators ligate only once. In our case we ligate below and above, and cut between. The first branch of the facial nerve is exposed at the hiatus fallopii and the greater superficial petrosal nerve, and crosses the field of operation to the sympathetic plexus, or sometimes makes an exit from the foramen ovale which would account for temporary facial paralysis in some cases recorded. The upright position is likewise an aid to diminish hemorrhage. Another danger is injury to the brain

by possible retraction or perforation of the dura when separating it from the floor of the middle fossa, and finally misinterpreting the anatomical anomaly so frequently encountered. Speed of the operator must be considered as a factor, as well as a well chosen anesthetist. In the case I am about to report, nitrous oxide oxygen was employed by Dr. Warner, an expert on Providence Hospital staff.

Traumatic keratitis is overcome by immediate protection of the cornea from abrasion.

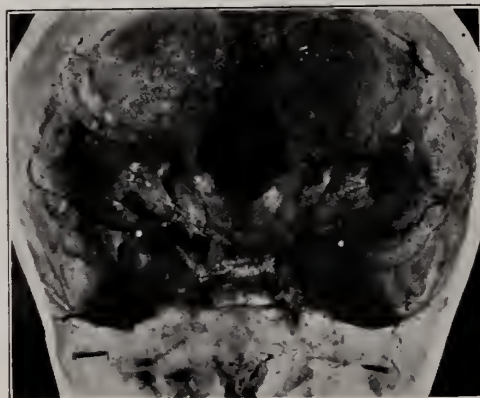


Fig. 4. Foramen spinosum showing course of middle meningeal artery.

during and following the operation. A well supplied shield worn for ten days to two weeks, followed by the use of protective glasses, has brought the patient up to the present time free from any trophic disturbance.

Dr. U. T. Coughlin in an article (S. G. O. 1921), describing section of the sensory root of the fifth cranial nerve under local anesthetic, claims he had trouble with bleeding and trying to maintain the head in position by the general anesthetic; however, my preference would be nitrous oxide oxygen or ether, since the danger of secondary hemorrhage following local anesthetic is greater. I will state that at no time during my operation was I concerned about the anesthetic given and, furthermore, after severing the sensory root the patient came out from under the anesthetic sufficiently to determine by the insensibility of the cornea and side of the face, that complete severance of the sensory root was affected.

Mrs. M. V. B., age 70, born and lived all life in Alexandria, Va., was first seen in July 1920.

FAMILY HISTORY: Father died at age of 30, cause of death unknown but had been victim of neuralgia several years before death. Mother

died of influenza at age of 75. Paternal grandfather and grandmother died of old age, cause not known. Maternal grandparents, cause of death unknown.

One sister died, age 45, of child birth. Another, age 39, died from influenza. Brother died from blood poisoning. Does not recall any gonty ancestry.



Fig. 5. Showing foramen spinosum in the squamous portion of temporal bone.

PERSONAL HISTORY: Previous state of health, aside from an attack of whooping cough, remained well until the age of 13 years when she was ill with an infected arthritis. She had subsequently malaria and suffered from attacks of sick headaches which continued after her marriage. Had three children, all normal births.

PRESENT HISTORY: Fifteen years back had a sudden intense shooting pain along the supra- and infra-orbital branch of the fifth nerve,

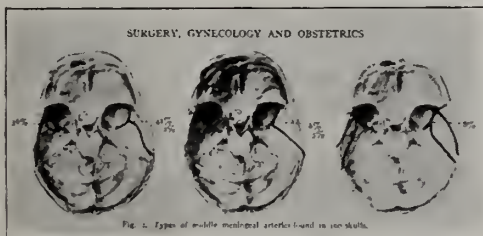


Fig. 6.

which lasted several hours and recurred at intervals of three to four weeks—longest interval three months; during the winter on damp cold days, pains were more intense and more frequent. The taking of food or drinking of cold water excited the paroxysms and kept

her in mortal terror of recurrent attacks. Eleven years ago she had her teeth extracted and finally submitted to injections of alcohol into the supra- and infra-orbital branches, which afforded her relief for several years but later recurred with greater intensity.

PHYSICAL EXAMINATION showed patient undernourished, evidence of intense suffering, face drawn to right side, and hypersensitive even to light and gentle touch of skin, lacrimation and increase of buccal secretions attended attacks. Subsequent X-ray investigation eliminated any sinus involvement. Wassermann test negative; urine contained indican and serum albumen but M. E. negative; blood pres-

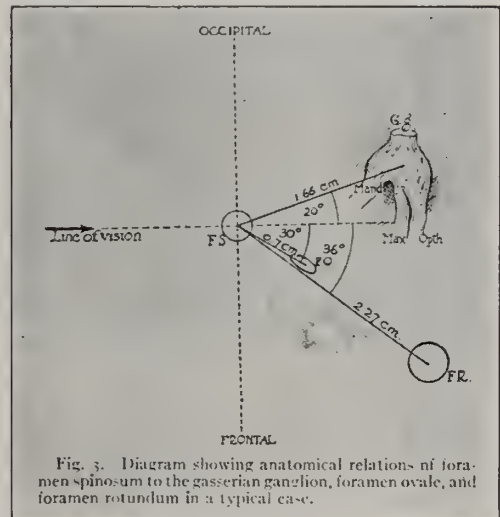


Fig. 7.

sure systolic 250, diastolic 100, was given butyl chloral hydrate (B. C. H. 5, glycerine 10, aquae qs. ad 60.) with caution during attacks, which gave transitory relief. Blood pressure after attacks was systolic 162 and diastolic 85. After observing that the attacks continued with unabating violence and patient was growing weaker, I decided to operate by severing the posterior sensory root.

Patient was admitted at Providence Hospital, May 25, 1922, and was prepared for operation. The right side of skull was shaved and usual preparations instituted.

Patient was placed in extreme Fowler position and head supported with a head-rest; nitrous oxide oxygen was administered by Dr. Warner, of Providence Hospital staff; a longitudinal incision was made extending upward about 8 c.c. from the preglend tubercle of

the zygoma, temporal fascia was opened obliquely, exposing the temporal muscle, and the fibres separated, exposing the pericranium to increase the exposure of the skull; the temporal fascia was cut along the upper border of the zygoma. A simple trephine opening was made through the squamous portion of the

interrupted sutures and the skin closed by a subcuticular suture.

Direct reflected light with a head mirror was all the illumination necessary.

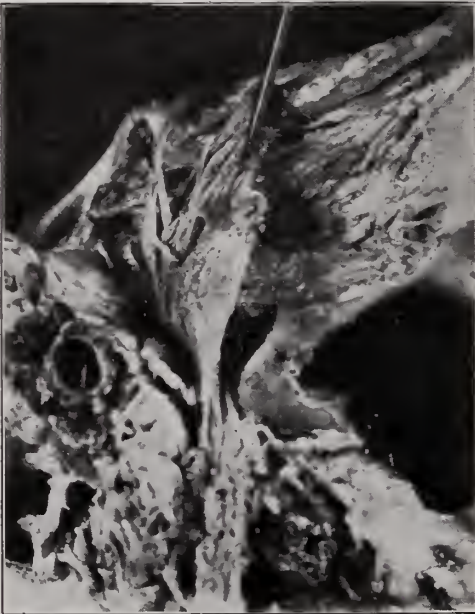


Fig. 8. A dissection of ganglion showing the motor root with its distinct fasciculus.

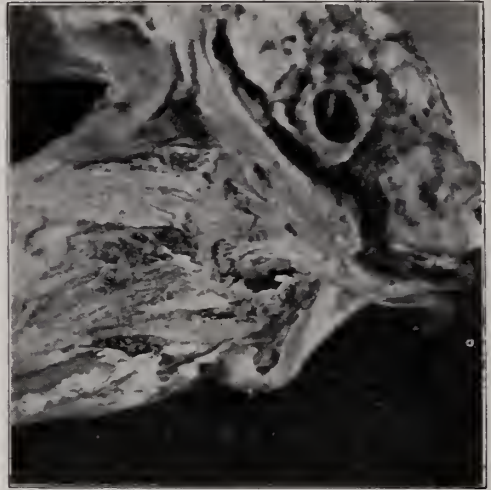


Fig. 9. Showing multiple bundle of nerve fibres in ganglion with motor root obscured.

temporal bone, and the opening enlarged downward as far as possible, rather than upward, thus avoiding the posterior branch of the middle meningeal artery and giving a better field and less retraction of the cerebrum; upon raising the dura by sponge dissection of the middle cranial fossa, there was more or less hemorrhage which was easily controlled. The branch of the middle meningeal artery was traced back to the foramen spinosum and a small amount of surgery wax inserted around its base. A small blunt hook with an eyelet carrying a silk ligature was placed around the vessel and tied. Further dissection upward and to the left disclosed the ganglion. The covering of the ganglion was opened after locating the superior and inferior maxillary branches and the fibres of the sensory tract separated in mass from the motor root and severed by a right angle knife. At this stage the patient came from under the anaesthetic sufficiently to determine the insensibility of the conjunctiva and gave assurance that the operation was successful. The fascia of the temporal muscle was closed with several

The right eye was protected and drops of fresh solution of 5% argyrol instilled after irrigating twice daily with 4% boric acid. There were no complications and the patient left the hospital eight days after the operation. Her freedom from pain was attended with an increase in metabolism: has gained eight pounds in weight: her blood pressure systolic 135 and diastolic 80.*



Fig. 10. Showing no paralysis of facial muscles.

DEDUCTIONS: It does seem that severance of the sensory root of gasserian ganglion should

*Since above report, three other cases have been successfully operated upon.

be thought out and performed more frequently than heretofore, in view of the diminished risk attending operation, improved technique, and low mortality.

The lack of sensibility and anaesthesia on one side of face as a result of these operations does not in the least incommode the activity of future good health and the gratitude of relief overshadows the few after cares of the eye that are entailed.

Results to date show that the best that can be accomplished in extra cranial surgery is relief for a time but no assurance of a cure and a



Fig. 11. Showing absence of scar above hair line—final result.

certainly of a return of symptoms in greater magnitude than before. To doom a patient to the eternal hell of morphine for relief is cruel, unscientific, and should meet with a determined stand on the part of the medical and surgical profession.

Finally, if neurological surgery never reached beyond the achievement of a successful relief to these most unfortunate individuals, it has triumphed in this sphere, to command your strongest support.

1623 Connecticut Avenue.

REFERENCES

Journal Surgery, Gynecology and Obstetrics, page 425. "Section of Sensory Root of Fifth Cranial Nerve Under Local Anesthesia Cocaine 2 per cent." Prof. Coughlin, St. Louis University.

"Only fourteen of the facial muscles are required to produce a smile and more than four times as many to contract a frown. Why frown?" (*Bulletin Chicago School of Sanitary Instruction.*)

THE ACTIVITIES OF THE TUBERCULOSIS DIVISION OF THE HEALTH BUREAU, DEPARTMENT OF PUBLIC WELFARE, RICHMOND, VIRGINIA.*

By W. NELSON MERCER, M. D., Richmond, Va.
Director, Tuberculosis Division, Health Bureau.

This paper is intended to emphasize the advantages to be gained not only by the private practitioner and the community in general but also by the tuberculous patients themselves, when the full co-operation of physicians is given with various activities of the City Health Bureau.

It is interesting to quote from an editorial appearing in a recent issue of a publication of the National Tuberculosis Association† concerning this very subject, as follows:

"While efficient antituberculosis work is carried on in nearly all cities by some agency, the municipal health department plays in most cases a very small part in this important field of public health. In only 46 out of 83 cities (largest in the United States) are there municipal tuberculosis clinics; in only 45 are there tuberculosis nurses; in only 29 has the health department any specific appropriation definitely earmarked for tuberculosis work; and in only 13 is there a separate bureau of tuberculosis, and in only 6 a full time director. The budgetary allotment for 23 cities having a definite allowance is 4.9 cents per capita. We believe that every health department in a city of 100,000 population should include on its staff an expert, specifically charged with the supervision and co-ordination of the campaign against the most deadly of preventable diseases, for, whatever aid may be offered by private agencies, the strategy of a widely conceived antituberculosis campaign can be fully executed only by the official health authorities of the community." Quoting again from the same editorial: "In other words, what is needed in the tuberculosis field is a more definite emphasis on the need for strong, technically efficient, and properly financed municipal and county health departments as the first and most important essential in the ultimate control of tuberculosis in the community."

The Tuberculosis Division of the Health Bureau, Department of Public Welfare, Rich-

*One of a series of lectures and demonstrations to a class of physicians in tuberculosis, held under auspices of the Health Bureau Department of Public Welfare, Richmond, Va., February 15, to April 15, 1923.

Read at a meeting of the Richmond Academy of Medicine and Surgery, June 12, 1923.

†Journal of the Outdoor Life, March 1923.

mond, Virginia, has a well organized and efficient free tuberculosis clinic; it has two full-time tuberculosis nurses and eight other nurses who devote part of their time to this work; a specific appropriation for tuberculosis work; a full-time Director of a separate Division of Tuberculosis; and a municipal sanatorium for white, and one for colored tuberculous patients.

This organization is the result of the foresight and progressiveness of Dr. E. C. Levy, Director of Public Welfare, and Dr. C. C. Hudson, Health Officer of Richmond.

The City Law (Code 1910, Chapter 25, Section 95) requiring reporting of cases of pulmonary and laryngeal tuberculosis is as follows:

"Every physician practicing in the City of Richmond, who shall be in attendance upon a patient affected with small-pox or varioloid, cholera, scarlet or yellow fever, diphtheria, measles, pulmonary or laryngeal tuberculosis, or typhoid fever, shall report the name and location of the patient to the board of health in writing within twenty-four hours after he is satisfied of the existence of such disease, and he shall also report the recovery or death of every such patient under his charge; and for his failure to comply with either of these requirements, the physician so offending shall be fined ten dollars for every twenty-four hours he so fails to report concerning such patient." This has been in effect since August 17, 1906.

The State Law (Chapter 226, Acts of 1916) regarding the restraint of careless consumptives is as follows:

"1. Be it enacted by the general assembly of Virginia, That all persons who are suffering from tuberculosis, who shall violate the laws prohibiting expectoration in public places and vehicles, or who shall deliberately and continuously place the health of any person in danger of infection with such disease, shall, upon motion of any member of the Board of Health of any county or city in the Commonwealth, before the circuit court of said county or city, be summoned to appear before said Court to answer said charges, and if, after hearing, it be found that such person is guilty of the conduct charged and is a menace to the health of the public, or is unnecessarily exposing other persons to infection with tuberculosis, the said court may order such person to be restrained and detained

for a period not exceeding twelve months, in some suitable place, or be required to give bond in a penalty to be determined by said court conditioned upon a cessation of the practices complained of, for such period not exceeding twelve months, as the court may determine. Said court may at any time, for good cause shown, rescind or modify such order, or make such disposition of said person as may be authorized by existing laws."

The regulations of the State Board of Health require that all cases of tuberculosis be reported to the local authorities who shall send copies to the State Board of Health.

The following agencies are supplied by the Richmond Health Bureau, in the fight against "the great white plague":

- A. Director of the Tuberculosis Division.
- B. Preventive Measures.
 1. Printed Precautions.
 2. Instructions to Patients and Others at Home and Clinic.
 3. Milk Pasteurized, or from Tuberculin-Tested Cows.
 4. Sputum cups and Paper Napkins.
- C. For Diagnosis.
 1. City Laboratory.
 2. Tuberculosis Clinic (Including Nutrition Clinic).
 3. Tuberculosis Clinician (Consultant).
 4. X-ray (through Clinic and Hospitals only.)
- D. For Treatment:
 1. Tuberculosis Clinician.
 2. Nutrition Expert.
 3. Tuberculosis Nurses.
 4. Tuberculosis Sanatoria.
 5. Tuberculosis Literature.

The Director of the Tuberculosis Division of the Health Bureau is also the City Tuberculosis Clinician, and, as such, is in charge of the operation of the Clinic and of the consultation service in special cases. He is also the Chief Visiting Physician to Pine Camp Sanatorium and to the colored Tuberculosis Pavilion.

Instruction in the prevention of tuberculosis is given by the clinic staff to all who attend the clinic. The nurses impress upon all patients visited in their homes the proper method of disposal of sputum, care of the person, bedding, clothing, etc.

During the past winter a course of instruction in the diagnosis, prevention, and treatment of tuberculosis was given to a class of

physicians, weekly, at the clinic, and practical demonstrations of selected cases served to make the course of more practical benefit.

All milk sold in the city is pasteurized or comes from tuberculin-tested dairy cows, and infection from this source is thereby prevented.

The City Laboratory offers facilities free of charge for the examination of sputum, spinal fluid, blood, exudates, transudates, tissue, and guinea-pig inoculation with post-mortem findings as an aid in the diagnosis of tuberculosis.

The Tuberculosis Clinic, located at 1108 Capitol Street, is open from 11:30 A. M. to 1:00 P. M. on Tuesday and Thursday, for white patients; on Monday and Wednesday from 11:30 A. M. to 1:00 P. M. for colored patients.

Physicians may accompany or refer their patients for a thorough examination of the chest and throat. Advice is given to each patient individually concerning his hygienic, dietetic, medicinal, occupational, and social regimen to be followed at home, or while awaiting admission to a sanatorium, or after his return therefrom. A very practical and complete pamphlet, entitled "The Treatment of Tuberculosis in the Home," issued by the Richmond Health Bureau, is given to every patient who is to be treated at home.

In those cases who are unable to purchase medicines, the Clinic furnishes tonics and cough mixtures, if they are deemed necessary.

Paper sputum cups with metal holders and paper napkins are furnished at the Clinic to all patients diagnosed as tuberculous. Thorough instruction in their use is also given.

The Nutrition Clinic is held weekly, at 1108 Capitol Street, from 3:00 to 5:00 P. M., on Friday, for undernourished children. Each child is given a chest examination by the Tuberculosis Clinician, and then a general examination by the Nutrition Expert. Special attention is directed to the general development, per cent underweight, glands, teeth, tonsils, skin, bones, and joints. Abnormalities are noted and their correction recommended.

An arrangement has been perfected whereby diseased tonsils and adenoids, of those patients who are unable to pay more, are removed at the City Hospitals for a fee to cover the operating expenses only. The nose and throat specialists of the city give their time and skill freely to this worthy cause.

A diet list is prescribed for every under-

nourished child, showing the amount of each article of food to be eaten, its preparation, and the time for feeding.

Graphic notation of the physical examination is made in each patient's chart whenever he visits the Clinic, X-ray, laboratory, and nurses' reports are attached, and the progress of the case is entered. These reports are strictly confidential. Mothers are urgently requested to accompany their children to the Nutrition Clinic in order to become familiar with the instructions given.

Several chest and nose and throat specialists render valuable services voluntarily in the Clinic on regular days.

In Richmond, during 1922, there were 77 deaths from pulmonary tuberculosis among white people and 125 among negroes, which will throw some light upon the incidence of tuberculosis among the white and colored population of the city. It is estimated that for every annual death from pulmonary tuberculosis, there are 10 active and 10 arrested cases in the community, or approximately 4,040 cases.

The inverse ratio between the number of visits to the Clinic by white and colored patients and the death rate in each race illustrates conclusively the different results obtained among people who want to co-operate and those who fear to know their true condition until too late for hope of recovery.

	Number Visits		Death Rate
	To Clinic	No. Deaths	Per 100,000
White	1625	77	62
Colored	435	125	229
Total	2060	202	113

Private Consultation in Special Cases: The service of the City Tuberculosis Clinician is available for consultation with private physicians throughout the city in those cases of suspected or complicated tuberculosis who are confined to their homes, or unable to go to the Clinic. Every effort is made to reach a correct diagnosis, advice is given to the physicians concerning the treatment to be followed and what disposition is thought best for the patient, whether sanatorium, home, or special treatment. In those cases which require artificial pneumothorax treatment, this can, upon the family physician's request, be continued as long as necessary by the patient visiting Pine Camp Sanatorium, or the Colored Tuberculosis

Pavilion, at regular intervals for refills, after he has remained the allotted time as a patient in either of these, or in any other sanatorium, and has undergone this special treatment along with the routine treatment for all tuberculous patients.

Patients who are unable to pay, and patients presenting surgical or other complications needing correction, are admitted to the city hospitals, if necessary, when this action is sanctioned by the attending physician. Here the patient is treated by the city attending staff of specialists free of charge.

X-ray examinations are made only of those persons who attend the Clinic, or of patients in the city hospitals and sanatoria, and for these only when it is a necessary aid to diagnosis.

Tuberculosis Nurses. At present there are two nurses of the Health Bureau who devote their entire time to tuberculosis activities, and eight other nurses, a part of whose time is spent in tuberculosis work. Their function is to visit in their homes all tuberculous patients reported to the Bureau of Health, where instruction in the proper care of the patient can best be given, the home conditions noted and improved, and precautionary measures instituted. They also arrange for institutional care when deemed advisable. When needing financial aid the case is referred to some public or private agency. When needing bedside care the patient is referred to the Instructive Visiting Nurses' Association.

These nurses also instruct the other members of the family or any suspicious cases, and wherever contacts are found, they refer them to the family physician or to the clinic for examination. Each patient examined at the clinic is visited at the home by a nurse.

It would be of great assistance in the fight against tuberculosis for physicians to be perfectly frank with their patients by telling them of the true nature of the disease, not a "spot on the lungs," or "weak lungs," its treatment, and how to prevent its spread to others. In this way the duties of the tuberculosis nurses would be made much less arduous and the co-operation of the patients much more easily obtained.

At the Clinic the tuberculosis nurses assist in the examination of the patients, thereby becoming more familiar with their condition and any complications which may exist, thus en-

abling them to carry out the home treatment and give advice more intelligently.

The Clinic follow-up system is carried on by these nurses, who visit any patient who fails to appear at the clinic on the day scheduled for his return. In this manner an accurate check on the progress or retrogression of each patient is made effective, and it is largely to the careful supervision and personal interest of these tuberculosis nurses that the present arrested condition of many clinic cases is due, for otherwise they would probably be helpless invalids and charges on the charity of the city. The number of visits paid during 1922 by nurses doing tuberculosis work was 6,330.

Admission to City and State Sanatoria. Before a person is eligible for admission to Pine Camp Sanatorium, operated by the Department of Public Welfare of Richmond for white tuberculous patients who are unable to pay for treatment elsewhere, or to the Tuberculosis Pavilion at Second and Hospital Streets, for colored patients, each applicant must be examined by a member of the City Tuberculosis Clinic Staff and passed upon by the Director of the Tuberculosis Division. This is necessary to determine whether or not the case is suitable for sanatorium treatment.

In addition to the physical examination, a thorough social and financial investigation is carried on by social investigators, the object of which is to prevent non-residents of Richmond, and those who are able to pay their way to other sanatoria, from becoming charges on the city. In this manner only the worthy cases needing sanatorium treatment are admitted to the free city institutions. Each applicant is put on the waiting list as soon as found qualified, and each must await his turn for admission, no favoritism being shown.

The State Sanatoria for white tuberculous patients are operated for *bona fide* residents of Virginia, in the early or moderately advanced stage of the disease. The cost to the patient is one dollar (\$1.00) a day, the State making up the difference in actual operating expenses. Blue Ridge Sanatorium is located near Charlottesville, and Catawba Sanatorium near Salem, both in the mountainous section of Virginia. Piedmont Sanatorium, at Burkeville, is operated by the State for native colored tuberculous patients. The cost to the patient here is only fifty cents (.50) per day,

the State making up the difference. Only early and moderately advanced cases are accepted for treatment.

Whenever an eligible early or moderately advanced case of tuberculosis is found at the city clinic or in consultation, he is advised to go to a State Sanatorium if able to raise the necessary funds. But if a resident of Richmond with pulmonary tuberculosis, and he is financially unable to pay, or is too far advanced for the State Sanatoria, he is admitted as soon as possible to a City Sanatorium.

Frequently money is provided by one of the welfare agencies of Richmond to pay the expenses of a patient in a State Sanatorium while awaiting admission to Pine Camp, thereby removing the danger of infecting other people, and allowing the patient to start "the cure" under ideal conditions at once.

It is expected that when the new buildings at Pine Camp Sanatorium are completed and the capacity is increased to 92 patients, this present unavoidable delay will be removed.

Examination of Contacts. It is the duty of every physician to examine every six months all persons exposed to a case of tuberculosis, and if the least uncertainty arises as to the condition found, he is urged to call in consultation the City Tuberculosis Clinician, who will assist the physician to arrive at a correct diagnosis and advise proper disposition of the case.

Post-Sanatorium Care of Arrested Cases. The arrested cases of pulmonary tuberculosis constitute a problem all to themselves, and frequently tax to the limit the resources of the physician, their families, and the municipal and welfare agencies concerned in their condition and livelihood.

Fortunately for Richmond, only a few indigent migratory consumptives pass through or locate here, but occasionally we have to provide treatment and support for such cases when they have acute exacerbations of this disease in our midst. As soon as their condition permits, however, these transients are returned to their original locations.

The resident cases of arrested tuberculosis are followed-up by the tuberculosis nurses, and examined periodically at the clinic or by their own physician. According to their physical findings and general condition, advice is given them concerning the regulation of their daily life, suitable occupation, amount of exercise,

proper food, and living conditions. Sleeping porches are constructed whenever possible.

The question of suitable employment is ever-present in patients just returned from sanatoria, and not infrequently they are, of necessity, forced to change their occupation to one more healthful and less apt to cause a recurrence of activity. This, in many cases, is almost impossible, due to lack of sufficient education or resourcefulness. Many arrested cases have found suitable positions through the Employment Bureau of the City, and others by means of private agencies and friends.

During the first year of post-sanatorium life, all ex-patients are directed to be examined every month either at the clinic or by their own doctor and, should unfavorable signs or symptoms develop, they are advised at once what is best to be done.

Supervision of these arrested cases is never entirely given up, for some of them would very probably break down if not checked up at intervals.

Room 409, City Hall.

THE ROENTGEN RAY IN THE TREATMENT OF CERTAIN TYPES OF METRORRHAGIA.

By FRED M. HODGES, M. D., Richmond, Va.

In metrorrhagia, with or without fibroids, the action of the X-ray or radium is twofold: There is (1) the direct action on the tumor or enlarged uterus, and (2) the action on the ovaries. In the tumor itself the ray causes an edema of the endothelial lining of the capillaries, followed by an obliterative endarteritis and anemia of the tumor. In the tumor the cell nuclei show hypertrophy, then coagulation necrosis and destruction, later to be replaced by connective tissues. This is not only due to the results of an obliterative endarteritis, but also to the direct action of the ray on the cells. The effect on the ovary is first on the ripe Graafian follicles, then on the primordial follicles, and lastly on the interstitial tissues.

The action of the X-ray and radium is identical, except that the X-ray is slower in fat patients and is much more reliable in large tumors.

Corscaden in a study of 250 cases treated with the roentgen ray and radium found that bleeding ceased or became normal immediately after one radium or one X-ray series in forty per cent. of the cases; within one month,

twenty-one per cent.: within two months, thirteen per cent.: within from three to six months, ten per cent. Further treatment was necessary in fourteen per cent. There were one and one-half per cent. failures.

Dysmenorrhea stopped in every instance. In 105 fibroids with masses large enough to measure there was reduction in all but one. This patient had only one moderate radium treatment. The most rapid reduction was in a mass 20 cm. in diameter which disappeared entirely in six months; the one least affected was reduced from 15 cm. to 8 cm. after three years and, after seven years, is about the same size.

After the use of radium, thirty patients had discharge. The watery discharges were stopped by the X-ray. The others were mucopurulent and thought to be due to the ulceration caused by radium.

There has been no inflammation in cases treated with the X-ray. Corcoran believes these infections are usually due to faulty technique in the application of radium and not to the action of the rays on latent foci. He went very carefully into the effect of artificial menopause in these women. Hot flushes were the most constant symptom, but usually did not give a great deal of trouble. There was no effect on sexual desire. In two this seemed to be increased; in two, decreased. About an equal number gained and lost weight. There was no effect on the appearance of age. In the large majority of instances the patients were in better general health and less nervous. A few were more irritable and nervous.

Of the various accidents and changes which might occur in fibromyoma (toxemias, degeneration, inflammation, sloughing, etc.) none was noted. The treatment was unqualifiedly successful in ninety-one per cent.

Beclere, in 709 metrorrhagias due to fibroid treated with the X-ray alone, reported ninety-eight per cent. good results. In this series of 700 cases, eighty-eight per cent. were forty years of age or over; and twelve per cent. were under forty years of age. Eighty-four and a half per cent. of his patients had palpable abdominal tumors. He gives the following table showing the number of cm. which the tumors extended above the symphysis pubis:

25-30 cm.	9	2.66 per cent.
20-24 cm.	25	7.39 per cent.
15-19 cm.	51	15.08 per cent.
10-14 cm.	111	32.84 per cent.
5-9 cm.	104	30.76 per cent.
1-4 cm.	38	11.29 per cent.

Prolonged metrorrhagia and the tumor were usually the cause of medical advice being sought. Pressure on the bladder was occasionally noted. In some catheterization was necessary. Reduction in the size of the tumor in many cases was as rapid as 1 cm. per week and took place from two to three months before cessation of menses.

Clark, in an analysis of 527 cases of myoma uteri and myopathic lesions treated with radium, concludes that, "Irradiation is the treatment of choice for the smaller myomas in women approaching or within the menopausal years whose only symptom is hemorrhage." In this large series only fourteen operations were necessary. There was one death. He believes that if all of the patients had been operated upon there would have been ten or more deaths anyway. He states that after irradiation the majority of tumors shrink greatly or disappear entirely. Malignant changes rarely occur, and after all symptoms are relieved he considers them cured.

Geist says: "To my knowledge there are no cases in which after or during the roentgen treatment a malignant condition has developed locally. It cannot be argued that the bad results have not been recorded and we must, therefore, alter our point of view as regards the roentgen ray treatment of fibroids. If after irradiation and prolonged periods of observation, no malignancy develops in the uterus and no metastases occur, then we are bound to say, not only that the roentgen ray caused a beneficent result in fibroids, but also in cases complicated by sarcomatous change or those cases of sarcoma not diagnosed."

Graves, of Harvard, feels just about as Clark does toward the irradiation treatment of metrorrhagia.

We have treated fifty-eight cases with the X-ray. Nine of these were very large fibroids, the tumor extending above the umbilicus; sixteen were smaller fibroids; and the remainder were cases with marked bleeding but no demonstrable tumor. Two patients were more than sixty years of age, had large tumors, and had been bleeding profusely for several years. One of these has had no trouble for

more than a year. The other case has had radium twice and X-ray and is very much improved, but is still having some trouble. She is a very poor surgical risk and an extremely fat woman, weighing around 250 pounds. The large powerful machines may get results in such cases, but the present ten inch gap machines will not. Several factors in this case make it a very difficult one: (1) the effect which castration has on these tumors is lacking, and (2) the extreme obesity makes it impossible to get a full dose of ray into the tumor. This is the only complete failure in the series.

Three patients have had a recurrence of the bleeding and required further treatment. Two of the very large fibroids, though markedly reduced in size, can still be palpated through the abdomen. There is no bleeding and the subjective symptoms have been relieved. The other seven large fibroids have either entirely disappeared or are so small they cannot be palpated.

We have treated six patients under thirty with the X-ray. In five of these the periods have been normal for more than a year; and in one, on account of severe loss of blood and an extreme anemia, the treatment was pushed to castration. This girl has hot flashes, but is in far better health in every way than she has been in years.

Considering the entire series from the standpoint of results in percentages, the treatment was entirely successful in ninety-three per cent. of the cases. In five per cent. the subjective and objective symptoms were relieved, but small tumors persisted, and in two per cent. the treatment was a failure. In patients more than thirty-five years of age our results have been almost perfect. Occasionally a patient is more or less knocked out by the treatment, but this is only temporary. No accident of any kind has occurred. If a patient lives out of town, radium is preferred unless there is some contra-indication to its use. If hemorrhage is not entirely controlled by the radium, a few X-ray treatments are given.

In every patient a pelvic examination by one experienced in this work and a diagnostic curettage are made, if deemed necessary, before X-ray treatment is undertaken. Some experienced in the use of radium but with no knowledge of the X-ray do not believe that a case which has been a failure with radium

should then have X-ray. We can see no possible logical reason for this and have successfully treated four patients who had had one or more radium treatments. These patients were sent us by competent surgeons who considered them very poor surgical risks.

In the excessive loss of blood at the time of the menopause, irradiation therapy acts almost as a specific. I have been unable to find a single authentic report of a failure where a case was properly treated. The results are spectacular and permanent.

As to the degenerative changes, malignant changes, accidents, etc., which occur in the uterus or in fibroids treated with the X-ray or radium, they are practically nil. (Clark, one-half to one per cent.; Corseaden, 0 per cent.; Hanks, 0 per cent.). At Mt. Sinai in New York, they had no malignant changes occurring in a large series of fibroids treated with the X-ray.

In women past forty years we use heavy treatments and finish the treatment in a short time, but in younger women treat them for several months in order to avoid nervous troubles as much as possible.

In young women several short X-ray treatments will almost invariably control the bleeding for a long time, and in several patients it has been unnecessary to stop menstruation entirely. When menstruation has been stopped entirely, it will practically invariably return unless further treatment is given after several months have elapsed. If it is too copious at this time, an operation or castration by the X-ray can be considered.

We feel that in young women with fibroids a myomectomy should be done if possible; if the fibroids are fairly large and cannot be removed, a hysterectomy leaving the ovaries should be done; if, however, there are no fibroids but profuse menstruation, an attempt should be made to control the hemorrhage with the X-ray or very small doses of radium. In large fibroids in patients who are good surgical risks or where there is other pathology present, surgery is naturally the method of choice and X-ray therapy should not be considered. If the patient is a bad surgical risk, irradiation will in the majority of instances give a symptomatic cure and should be used.

In the idiopathic or simple metrorrhagias at the time of the menopause, irradiation will give almost 100 per cent. good results. In

small fibroids with hemorrhage during the menopausal years, irradiation also offers excellent results.

801 West Grace Street.

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THE IDENTIFICATION OF CLOSTRIDIUM TETANI (*Bacillus Tetani*).*

By GEORGE F. REDDISH, Ph. D., Richmond, Va.
Associate Professor Bacteriology, Medical College of Virginia.

Interest in the study of the anaerobic bacteria has increased very considerably within the past few years, especially during and since the last war. Very extensive studies were made during this time on the war wound anaerobes, particular attention being given to pure culture studies for classification purposes to facilitate the identification of those species found in war wounds. These intensive efforts brought forth much new material of great value and have put the classification of anaerobes on a more sound basis than they had ever been before. As a result of certain phases of this work, a clearer understanding of the identity of *Clostridium tetani* (*Bacillus tetani*) has been made possible.

In the text-books of today, even those revised this year, little or no light is thrown upon two species, *Clostridium putrificum* and *Clostridium tetanoides*, which resemble *C. tetani* very closely morphologically and which are easily confused with it in microscopic appearance. In text-books, the drumstick spore form of *C. tetani* is given as characteristic of this species alone. Therefore, the form of spore is still greatly emphasized in the identification of this deadly organism, and very often microscopic appearance of the spore is the only basis upon which diagnosis is made in the examination of pathological material. In the

light of recent investigation, it is found that such preliminary observations of morphology constitute but the beginning of the identification of the tetanus bacillus; other more distinctive characteristics are necessary for this purpose.

In the same year that Nicolaier (1884) discovered the tetanus bacillus, Bienstock (1884) observed another anaerobe very similar to it morphologically, but which lacked completely any pathogenic property. This organism Bienstock named *Bacillus putrificus* because it was strongly proteolytic and caused distinct putrefaction in protein materials. It has been reported that *Clostridium putrificum* (*Bacillus putrificus*) has been found in much the same habitat as is *C. tetani*, namely, in soil, dung heaps, dust, in the intestines of many,—especially of herbivorous,—animals, etc. It is entirely possible, therefore, that many of the observations in which positive findings of *C. tetani* have been reported may have been, in reality, *C. putrificum*, for undoubtedly the presence of round, strictly terminal spore forms has been considered sufficient evidence to claim positive diagnosis of the presence of *C. tetani* in many instances. Certainly the tendency among most bacteriologists is to consider this drumstick spore form as characteristic of the tetanus bacillus.

During the war, Adamson and Cutler (1917) isolated from war wounds an anaerobe which shows spores very similar to those of *C. tetani* and *C. putrificum*, but which resembles the former even more culturally than does *C. putrificum*. However, it is non-pathogenic, and for this reason has been given the name *Bacillus tetanoides*. This organism, even more than *C. putrificum*, might be easily mistaken for the tetanus bacillus because of its cultural similarities and because it is found closely associated with it in wounds. It may, however, be found in wounds in which *C. tetani* is not present.

Pathogenicity is the most outstanding property of the tetanus bacillus; the type of spore is even secondary to it as a diagnostic feature, for the reaction in laboratory animals is characteristic. It is apparent, then, that *C. tetani* cannot be identified by observation of the spore form alone, but that toxicity tests must be made. When tetanus toxin is injected into the muscles of the thigh of the white mouse, for example, stiffening of the muscles

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Note: The genus name "*Bacillus*" has been supplanted by the term "*Clostridium*," according to the new classification scheme adopted by the Society of American Bacteriologists.

takes place within twenty-four hours, causing the animal to lose all use of the limb; death results within 48 to 72 hours. This reaction is typical of tetanus in laboratory animals; similar injections of cultures or culture filtrates of *C. putrificum* or *C. tetanoides* produce no symptoms whatever. Therefore, toxicity tests differentiate *C. tetani* from these two similar anaerobes. In order to prove conclusively that an organism is *C. tetani*, it is necessary to show that tetanus antitoxin protects against its toxin. However, simple toxin tests, showing typical reaction, serve sufficiently well for routine laboratory practice. If, on the other hand, the pathological material is from an undoubted case of tetanus, the finding of drumstick spores in such material might be considered tentative proof of the presence of the tetanus bacillus.

In the present work the object has been to determine cultural and biochemical differences between these three anaerobes which will identify them with a definiteness commensurate with their importance. Studies of colony form on agar, cultural observations in meat medium, milk, broth, gelatin and blood serum were given especial attention. Biochemical studies on the changes induced in peptone broth, showing by accurate chemical methods the peptolytic activity, and also quantitative determinations of the amount of dextrose consumed in dextrose broth by these three organisms were carried out in detail. The fermentative reactions in twenty-six test substances were also determined. These observations will be given in the order indicated above.

Surface colonies of *C. tetani* on dextrose agar are delicate, thin and spreading. They have a slightly raised central nucleus, but the surrounding area is flat and almost transparent in young cultures. There are short, irregular, large, forked projections which radiate out from the central mass in an intertwining fashion. The colonies of *C. putrificum* on dextrose agar are smaller, more delicate and almost transparent; they are irregularly dented, though not deeply so, and there are no outgrowths or fringe. *C. tetanoides* colonies, on the other hand, are dense, whitish, and glistening and have a wavy edge. There is also a tendency to form a filmy growth over the surface of the agar. These differences are distinct, and sufficient in themselves to distinguish the three species.

In meat medium (egg-meat medium, Rettger, 1906), *C. tetani* proves to be only slightly proteolytic; there is some disintegration of the meat particles, but no reduction of the bulk of the medium, no putrefactive odor and no other signs of visible proteolysis. *C. tetanoides* causes a reaction in this medium very similar to that of *C. tetani*, except that a white precipitate is formed throughout the medium, which is a distinct feature. The medium, like that of *C. tetani* cultures, becomes reddened, but never brown or black. *C. putrificum*, on the other hand, after about ten days' incubation at 37° C., shows definite signs of putrefactive decomposition of the meat. At first there is reddening of the medium, which gradually becomes darker, then brown and finally almost black in old cultures. Putrefactive odors are evident as soon as digestion progresses to the point at which the bulk of the medium is reduced. The putrefactive decomposition is so pronounced that the organism has been given a name which indicates that this property is dominant.

In milk there is no evidence of noticeable change on the part of *C. tetani* and *C. tetanoides*, but *C. putrificum* brings about almost complete digestion of the casein within three weeks. There is only moderate growth in broth by all three species, *C. tetanoides* producing a heavier turbidity than either of the other two. In gelatin, *C. tetani* produces only slight liquefaction, while *C. putrificum* liquefies gelatin readily and completely. *C. tetanoides*, however, is non-liquefying. *C. tetanoides* does not liquefy blood serum, even after long incubation at 37° C.; *C. tetani* liquefies it slightly after twelve days; *C. putrificum*, on the other hand, digests blood serum completely. There is some correlation between these reactions on the various protein media, the meat, milk, gelatin and blood serum; this is of value in showing the consistency of the results.

As regards the biochemical reactions, the differences are equally distinct. Of the twenty-six test substances used, including monosaccharides, disaccharides, polysaccharides, glucosides, and alcohols, *C. tetanoides* formed acid from three, but no gas from any of them. *C. tetani* produced only a fair amount of acid from dextrose, and only slight acid from two others, while *C. putrificum* formed only slight amount of acid from dextrose alone; no gas was formed from any of the test substances.

These reactions, though definite, are not so marked as to be of classification value. However, quantitative determinations of the amount of dextrose consumed by the three organisms is of more value. *C. tetanoides* reduces this sugar from 0.7% to 0.47% within 60 hours under optimum conditions for growth. •*C. tetani* reduces dextrose from 0.7% to 0.58% within the same period; *C. putrificum* consumed this sugar only slightly, from 0.7% to 0.64% in 60 hours. These differences are definite and quantitative, and are of classification value. Determinations of the action of these organisms on peptone show equally marked differences. Four tests were employed to show the progress of peptolytic action, namely, quantitative biuret, amino nitrogen, ammonia, and Sorensen figure. Reduction of biuret figure, and increase of amino nitrogen, ammonia and Sorensen figures is indicative of peptolytic action. *C. tetani* was shown to be less peptolytic than either of the other two organisms, giving only a slight decrease in biuret, and a corresponding slight increase in ammonia and Sorensen and amino nitrogen. *C. tetanoides* showed greater decrease in biuret, and greater increase in the other three figures. *C. putrificum* was found to be decidedly peptolytic, as might be expected from its extreme proteolytic activity. The biuret figure decreased very considerably, while the ammonia and Sorensen figures increased proportionally and to a high degree. The amino nitrogen was further reduced to form ammonia, and did not show a high final figure. Therefore, *C. putrificum* is decidedly more peptolytic than either *C. tetani* or *C. tetanoides*, and *C. tetanoides* is slightly more peptolytic than *C. tetani*.

In a detailed study of *C. putrificum* (Reddish and Rettger, 1922) the writer showed that the above characteristics are of definite classification value, and indicated furthermore that distinction between closely related species might be more clearly illustrated by such biochemical methods. In the present work, it has served to point out quantitatively certain fundamental differences between it and *C. tetani* and also *C. tetanoides*.

For purposes of identifying *C. tetani*, the toxicity test with characteristic reaction in laboratory animals is sufficient when quick results are necessary. When time and materials are not factors to be considered, some such procedure as outlined above should be em-

ployed. This would necessarily demand pure cultures of the organism, and the procuring of such is not always an easy task. At least, two courses are open for the accurate identification of *C. tetani*, and either may be used to suit the convenience and equipment of the particular laboratory. Certain it is, however, that observation of the spore form is not to be considered sufficient for positive diagnosis, but simply as a preliminary step.

SUMMARY AND CONCLUSIONS.

Clostridium tetani cannot be identified by observation of spore form alone, because of the close similarity of the spores of *C. putrificum* and *C. tetanoides*. The latter organisms are non-pathogenic; therefore, a differentiation can be made between *C. tetani* and these two species by toxicity tests. The reaction of tetanus toxin in laboratory animals is characteristic, a stiffening of the musculature into which the toxin has been injected being a distinct feature by which the organism can be recognized. For final identification, it is necessary to show that tetanus antitoxin protects against this toxin. The observation of drumstick spore form, then, is but a preliminary step; the toxicity test is necessary in routine pathological work of this kind.

Where possible, or feasible, cultural and biochemical properties can be used for identification, and these are even more accurate, in that the various tests made should corroborate the findings in the other cultural tests. It is found that the tetanus bacillus differs very markedly from both *C. tetanoides* and *C. putrificum* in the various standard culture media, and also in their action on peptone and dextrose. Colony forms on dextrose agar are also distinctive. It is necessary that pure cultures be used in the latter method, but in testing for toxin reaction, mixed cultures will suffice for toxin production.

C. tetani may be identified as follows:

1. It is anaerobic.
2. It is pathogenic, producing typical symptoms in laboratory animals.
3. It is only slightly saccharolytic and slightly proteolytic, forming small amounts of acid from only three sugars, and breaking down meat, casein, serum albumin, gelatin and peptone but sparingly.
4. It forms drumstick spores, that is, round, strictly terminal spores in a slender rod.

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Medical College of Virginia.

REPORT OF CASE OF RUPTURE OF THE UTERUS.*

By R. H. DUNN, M. D., South Charleston, W. Va.

Mrs. A. E. H., white, married, age 26 years. Mother living and healthy at age of fifty-three years. Father died of organic heart disease, at age of thirty-eight. Has three sisters and two brothers living. One sister died at age of fifteen of typhoid fever. One sister died of tuberculosis at age of twenty-two, following previous attack of influenza in 1919.

Patient has had ordinary diseases of childhood. She began to menstruate at the age of fifteen, was often irregular and generally suffered severe pains and cramping at menstrual periods. Medical attention had to be secured quite often at times.

Was married at the age of twenty-two and became pregnant after the first month. Health was good while carrying baby until term. The family physician was in charge of the patient and was called to deliver her on March 28, 1919, and he was unable to do so with forceps. I was called in consultation and a Cesarean section was advised. Patient was moved to Dunn Hospital in early morning of March 29th and was delivered of eight and a half pound baby girl by Cesarean section. Mother and child progressed very rapidly and were able to leave the Hospital on April 12, 1919.

Patient's health continued good until April 26, 1921, at which time she began to suffer severe pain in the right lower abdominal region. I was again called in consultation and the diagnosis of acute appendicitis was made. She was again brought to the hospital and operated on April 28, 1921. Her recovery was rapid and patient was discharged from the hospital on May 10, 1921.

HISTORY OF LAST ILLNESS: Menstruated last, September 14, 1921. Felt foetal movement

first some time in January. General health was delicate, suffered much with gas and indigestion, had pains occasionally in shoulder and arms and some slight pains in lower limbs. Placed herself in the care of her family physician after the first month.



Macerated appearance of uterus at removal.

On May 7th, patient walked out in the garden to pick some lettuce and while out there she noticed considerable pain in the abdomen and vomited quite a bit. This vomiting continued at intervals and her physician was called. Patient was put to bed and palliative remedies were used to relieve her. Patient's general condition did not improve and on May 11th, I was called to see her with her physician.

On Thursday, May 11th, patient was extremely distended, vomiting and bowels had not moved for four days; temperature 100 and pulse from 90 to 100; pain generalized over abdomen; respiration rapid and patient perspiring profusely at times.

Distention was so extreme that nothing could be determined by palpation, not even the position of the foetus. On vaginal examination the head was low down in the pelvis, L. O. A. There was no discharge, cervix was soft and about one finger dilatation.

Patient stated that first time she noticed the extreme shocked condition was on Wednesday, the 10th, when she was raised up to take some water at which time she became unconscious for a short time. Patient complained of a burning pain down low in both sides of abdomen,

*Read before the Kanawha Medical Society, November 28th, 1922.

not sharp, but she described it as a miserable feeling. Patient stated that at no time did this pain resemble any of the pain that she had experienced at the beginning of her last term of labor. Treatment given at this time was colon irrigation with good results; morphia was given at intervals and hot stupes were applied to abdomen.

Patient stated that a few days after this attack she could feel the movements of the child but is not positive as she thought that this movement may have been produced by her turning from side to side in the bed. Neither her physician nor I was able to hear any foetal heart sounds at this time and her physician stated that he had not noted them at any time from the 11th to the time of her operation, the 27th of May.

The diagnosis at this time was diffuse peritonitis, with a guarded prognosis.



Looking into fundus.

On May 12th, I was called out of the city for several days and on my return the physician informed me that the patient was gradually recovering. In about ten days from the onset she was able to sit up at short intervals and even walked to the bath room, when necessary. Patient, however, experienced a fullness of the abdomen and said that when on her feet she felt as if her abdominal muscles would give away and on lying down that she had a sore dull ache low down in both sides.

On May 27, 1921, she again began to suffer with pain in the lower abdomen, hips and back, and I saw her at her home and advised immediate operation. She was brought to the Hospital where the following symptoms were noted:

Patient suffered with pain in lower abdomen; abdomen had lost its general contour,

and had more of a flattened appearance, and almost a doughy feel; very little rigidity; child high up in abdomen; pulse 100; temperature 99.3; respiration 20.



Uterus split from cervix to fundus.

Vaginal examination showed cervix about one finger's dilatation; body of uterus to the left and low down in pelvis; on account of tenderness foetus could be felt but high up and to the right.

Operation May 27, 1921.

Old scar of previous operation in median line was excised and opened to peritoneum in usual manner. Peritoneum was picked up with Kelly's and opened with scissors; the first tissue encountered was placental tissue and the escape of considerable amount of coffee black fluid. The opening was enlarged and the foetus was delivered by feet. The placenta was attached to the anterior abdominal wall and partly incarcerated by the greater omentum. The placenta including the cord had a very dark putty appearance, as well as the viscera. This was carefully removed with practically no effort and very little if any bleeding from the omentum. Hot tapes were then introduced, and after the old clots and fluid were removed, the uterus was down low in the left pelvis with the whole fundus looking like a black cauliflower mass, practically contracted and very little bleeding.

The uterus was then caught with two large Kelly's, one in the anterior wall and one including the posterior wall, and a supra-vaginal hysterectomy was rapidly done. Both ovaries were in healthy condition but both tubes adjacent to the ruptured portion were very fragile and had the same putty appearance that

the uterus had. A great deal of care was taken in ligating the tubes, as the sutures if drawn usually taut would cut through the tissues. The tubes were not removed and were brought together and treated in the usual manner. Two omental adhesions to the abdominal wall were ligated.

Three pints of normal saline were put into the abdomen and the incision closed in the usual manner with drainage.



Supra-vaginal hysterectomy.
Uterus split after removal from cervix to fundus.

The foetus was a male of 8 pounds and evidently had been dead for some time, as in removing it from the abdomen, although sterile towels were used in order to hold it, the skin and flesh slipped easily.

The patient was put to bed and saline by rectum was given at intervals of four hours. She made a slow but gradual recovery and was discharged on June 28, 1921.

A few questions that may be asked in this case are:

At what time did this uterus rupture?

If this uterus ruptured on May 7, 1921, did it empty itself at once or did it do so gradually?

This pregnancy dated from September 14th, and would be due ordinarily June 21st. Was not patient evidently mistaken in the length of her pregnancy?

What effect did her former Cesarean section have on the case?

Were the pains that patient had on May 11th due to labor, to possible rupture at that time, or to an infection?

What would have been your position in the case on May 11th?

Would not this patient have had even more shock and pain from a severe hemorrhage on

that date than was indicated by pallor and pulse, or emptying of uterus?

How long had this uterus been ruptured from the appearance of uterus, fluid, viscera, and foetus?

CONCLUSIONS

Uterus ruptured on May 7th, but evidently emptied itself very slowly.

From appearance and size of foetus this patient was evidently pregnant a month sooner than stated.

The usual technic was used as in a number of other cases and we expected to do a Cesarean on this patient at term.

Had this patient been operated on May the 11th. I do not believe that she would have survived the operation.

From appearance of viscera, etc., this uterus evidently was ruptured three weeks before operation.

THE IMPORTANCE OF THE EARLY RECOGNITION, DIAGNOSIS AND TREATMENT OF MENTAL DISORDERS.*

By W. C. ASHWORTH, M. D., Greensboro, N. C.
Medical Director, Glenwood Park Sanitarium.

My subject for this paper has been selected on account of the far-reaching evil influence of the failure to fully appreciate the importance of recognizing and treating the incipient mental disorders. It is a well recognized fact that our whole social structure, to a large extent, depends upon the effectual treatment of those who are mentally defective. It is a sad commentary on our boasted civilization that a large per cent of our mentally deficient are languishing in our jails, so-called "county homes," etc. The appalling number of inmates of our State institutions is significant because of the fact that it clearly indicates a failure on the part of our profession to diagnose and successfully treat the mental disorders from which these unfortunate people are suffering, during the curable period of the disease. The medical profession fully recognizes the importance of early diagnosis and recognition of physical disease, whether amenable to medical or surgical procedure, but has not yet been fully aroused to the great importance of early diagnosis of mental cases. If we, as a profession, would exercise the same diagnostic acumen in the diagnosis and treatment of our

*Read before the North Carolina Hospital Association, at Wilson, November 2, 1922.

mental cases as we exercise in our medical and surgical cases, the results would be very materially different.

The mental delinquent is not only a menace to society, but has no earning capacity, therefore is a parasite on his or her family. We must also take into consideration that a mentally incompetent person oftentimes, in fact, generally, disrupts the family, and, therefore, lessens the earning power of those who are responsible for his behavior and conduct. The moral derelict is a dangerous person to his associates and the community, hence, the importance of finding the physical cause (most usually focal infection) responsible for his dereliction, since more exact scientific study has shown that at least six criminals out of ten are mental defectives, and that the same estimate, approximately, applies to paupers, habitual drunkards and dissolute women. In fact, mental deficiency underlies, to a large extent, our most troublesome social problems. The so-called "half-wits," or moral derelicts, are in effect high grade imbeciles, or, more properly speaking, morons, since their mental development corresponds to that of a normal child of twelve or fourteen years. It will be found, on close observation, that they lack judgment and reasoning power, and, as a natural consequence, their actions are inspired and directed by unregulated impulse. In other words, if untrained and uncared for, the mental defective becomes a criminal, a vagabond, a pauper, or a vicious and dangerous person, a constant menace to the community in which he lives.

It is obvious to my mind that the crime wave, which at the present time is exciting such widespread and justified alarm in the United States, is attributable, largely, to the activity of the high grade imbecile, who, in common parlance, has "gone bad," and is, therefore, a pronounced enemy of society. If, however, the mental defective were wisely and carefully trained during the acute stage of the disease he, ordinarily, would become somewhat useful to society; or, at least, partly selfsupporting; or, be transformed into a harmless person. The difficulty, however, of the problem of treating this large and increasing class of cases is greatly accentuated on account of the great number of mental defectives who are unrecognized, therefore, untreated during the curable stage of their disease. It is a lamentable fact that they are becoming more numerous every day, since

each succeeding generation produces a larger percentage of them, relatively speaking, to the total population. Their defection is markedly hereditary, and, unfortunately for society as a whole, they usually propagate their species very rapidly. It is a well established fact that criminals usually marry each other, therefore criminality is the natural and inevitable offspring of such marriages. I am reminded, just at this time, of a statement made by our own Rupert Blue, former Surgeon General of the U. S. Public Health Service, namely; "A true race of feeble minded people is being developed among us."

I believe the time is rapidly approaching when every municipal court will have in constant attendance a physician well versed in the diagnosis of mental disorders. The reason for the above statement is obvious if the premises of this paper are correct, since a large percentage of the criminals, who are daily arraigned before our municipal judges, will be found to be mentally incompetent on account, probably, of some physical disease—may be focal infection—which properly treated would obviate the necessity of the municipal judge passing a road or jail sentence to an individual who is both physically and mentally sick rather than a criminal *per se*. I have often thought of the great injustice, I might say unfairness, to the youthful criminal who receives such a sentence, and is, therefore, forced into the ranks of hard and seasoned criminals. If the youthful criminal is found, after a careful and painstaking examination by a physician who is an expert in the diagnosis of early mental diseases, to be suffering from some underlying physical or mental disease, he should be sent to a reformatory rather than have for his companions criminals and moral degenerates of our jails, etc.

I think the medical profession is in a position to help our municipal courts in meting out justice to our youthful criminals, and, thereby, will be able to save a large percentage of our mental defectives who, at present, are being classed as incorrigible youthful criminals. If we, as a profession, fully recognized the danger involved in the neglect of our mental defectives, I think the legislature of our State would soon enact laws requiring scientific treatment of weak-minded persons. If such law were enacted and systematically applied, it would be of inestimable benefit in the

way of reclaiming a large percentage of our mentally incompetent individuals.

Our State institutions, at the present time, are fairly groaning under the weight of the burden of undertaking to care for the chronic insane, hence the importance of the early recognition of mental disorders while the patient can be cured. It is well known that the facilities of our State institutions for the care of the insane are inadequate, notwithstanding huge appropriations from our State Treasury, to care for a large number of patients whose admissions are being constantly sought by their physicians, relatives and friends. The congested condition of our institutions is largely due to the fact that they are filled with the chronic insane, who are incurable, and, therefore, little room is left for the incipient cases, which might be cured.

The thought has occurred to me that a large mental clearing house, so to speak, controlled by experts on mental disease, would save the State much expense. The service of this board of experts on mental disease would save the embarrassment to the superintendents of our State hospitals and private institutions before the criminal courts, where the mentality of the criminal is questioned. The members of the board could pass upon the insanity of the criminal independent of the court room, and, in this way, the grilling examination by our attorneys, and, the oftentimes consequent humiliation to members of our profession would be avoided. A recent experience in our State has proven very conclusively to my mind the necessity of the so-called clearing house for mental cases, whether criminal or otherwise, and the need to secure admission for those who are really in need of treatment. It is true, however, that we have made rapid strides in this respect, as evidenced by our epileptic colony at Raleigh and vocational training for our mild mental cases.

I do not think that we can praise too highly the splendid work that is being accomplished by our State institutions for the care and treatment of the insane, and I seldom meet the superintendents that I do not feel disposed to congratulate them for the unstinted service which they are rendering the state. A very illuminating article, written by Dr. Albert Anderson and his associate, Dr. Victor R. Small, appeared in a recent issue of *Southern Medicine and Surgery*. I think every mem-

ber of our profession should read the article carefully in order to combat criticism of the management of our institutions, if for no other reason.

MINISTERS TO THE SICK.*

By WILLIAM J. MALLORY, A. M., M. D., F. A. C. P.,
Washington, D. C.

"Is my strength the strength of stones? or is my flesh of brass? Is not my help in me? and is wisdom driven quite from me? To him that is afflicted pity should be shewed from his friend."—Job. VI, 12:14.

Since the time when Job, being smitten with boils, cursed his day, man's need of moral and spiritual support as well as physical relief in the presence of disease has been recognized, and it has fallen to the lot of the minister of religion and the doctor of medicine to meet these two requirements.

It is only in recent years that law and medicine have become associated in an effort to deal in a constructive manner with the social problem of disease, delinquency, and crime, aiming at prevention and cure rather than simple punishment; whereas the relation between religion and medicine is older than civilization, the spiritual and physical welfare of mankind originally being in the hands of one man, the priest-physician.

With the increasing complexity of the social order and the resultant specialization in all activities, the work gradually became divided in such a manner that the priest concerned himself more particularly with ethical, moral and religious matters, and the physician with the physical aspects of disease. But specialization without co-ordination tends to limit the intellectual horizon, and so there developed what has been called the disharmony between science and religion; not that they are incompatible, for truth is unity, but because they saw each other "as through a glass, darkly," and not face to face.

Recognition of a common purpose should bring the minister and the physician together, not for fusion or reversion to a primitive type, but for mutual understanding and co-operation in human welfare work—ministration to the sick. Consideration of the subject from the dual view of science and religion may therefore be justified.

That the view should be different is natural.

*Address delivered before a joint meeting of the clergy and physicians at Trinity Episcopal Church, Washington, D. C.

for one is not born a physician or clergyman, but becomes such by calling, training and experience. The calling is similar in that both have the ideal of service; the training and experience are widely different. An important point of similarity not usually recognized is that of faith, for although physicians themselves little realize it, the main spring to all their professional activities is an abiding conviction in the existence of a universal law, both natural and divine, which rules in the physical and spiritual universe.

The words of Prince Gautama, as interpreted by Sir Edwin Arnold in his "Light of Asia," may well be taken as part of the physician's creed:

"Before beginning, and without an end,
As space eternal and as surety sure,
Is fixed a Power divine which moves to good,
Only its laws endure.

This is its touch upon the blossomed rose,
The fashion of its hand shaped lotus leaves,
In dark soil and silence of the seeds
The robe of spring it weaves.

That is its painting on the glorious clouds,
And these its emeralds on the peacock's train;
It hath its station in the stars, its slaves
In lighting, wind and rain.

It spreadeth forth for flight the eagle's wings
What time she beareth home her prey; it sends
The she-wolf to her cubs; for unloved things
It findeth food and friends.

This is its work upon the things you see;
The unseen things are more; men's hearts and
minds,
The thoughts of peoples and their ways and wills,
These, too, the great Law binds.

It will not be contemned of any one;
Who thwarts it, loses, and who serves it, gains;
The hidden good it pays with peace and bliss,
The hidden ill with pains."

Physicians are governed by the conviction that there is an understandable cause back of all changes; that changes occur as a result of an orderly sequence of events which may be investigated and understood. The knowledge so obtained is the rational basis for purposeful action in dealing with disease. So they investigate and by study and training avail themselves of the knowledge and experience so gained by others, striving to learn as much as possible of the normal functions of the human body and the changes that occur in it as a result of disease, in order that they may work intelligently to prevent, cure, or alleviate such conditions.

We all recognize that there is a natural tendency to recover from injury and disease, for we see wounds heal without the attention of the surgeon and we see people recover from infectious diseases without treatment of any kind. But by investigation of the changes which take place in tissues during healing, as well as the conditions which interfere with healing, the surgeon is now able to produce healing in wounds which would be mortal if left unattended, and to prevent or correct deformities otherwise hopeless.

As a result of the attitude of inquiry and long and painstaking investigation, the causes of many diseases have been learned and their mode of transference understood, and so it is now possible to prevent typhoid fever, small-pox, malarial fever, yellow fever, and many others. There are, however, some morbid conditions, due to heredity, previous disease, and age, which it is impossible at present to prevent or cure. But by understanding the normal function of organs and the character and degree of the impairment which occurs in these conditions, it is possible to do much to prolong life and increase efficiency by intelligently adapting the life, work and habits of the patient to a handicap which cannot be removed.

What has been said so far refers only to the more obvious aspect of disease. There is, however, another phase which, while less apparent, is of very great importance; that is, the manner in which the sick person reacts to the condition in which he finds himself. This is naturally not such an important feature of acute illnesses as it is of chronic impairment of health, or those permanent deficiencies which handicap one in the battle, without destroying life.

All of us have seen people slightly impaired in health who are a burden to themselves and an affliction to all who love them, while we know of others suffering from a long and painful illness who still do all that they can in the useful work of life and bear their affliction with such cheerful fortitude that they are an inspiration and blessing to all who come in contact with them.

As Montaigne says, "Men are tormented by the opinions they have of things and not by things themselves." A psychiatrist of wide experience points out how one man who has lost an arm becomes a beggar, while another

with the same impairment will readapt himself to the new condition and carry on successfully.

An inspiring example of successful adaptation of life in the face of great physical infirmity is found in the life of Edward Livingston Trudeau. When, as a young man at the beginning of his career, he came to Saranac, ill with tuberculosis, he did not resign himself to invalidism and moping, but, observing the effects of climate and right living on the course of the disease, extended his interest beyond himself to the help of other sufferers and found his life work, of which he wrote: "The struggle with tuberculosis brought me experiences and left me recollections which I never could have known otherwise and which I would not exchange for the wealth of the Indies."

Robert Louis Stevenson repeatedly found the way to a chosen profession barred by chronic ill health, but despite physical pangs and mental anguish he wrote such stories and verse as have lightened the burden of sickness for thousands of men, women and children.

It is in this domain of adaptation that the wise clergyman may be of the greatest assistance to the sick. But it is said that if Christ himself came to the world, he would not be permitted to heal the sick. To those who would follow his methods it may be said that he never violated any law or advised anyone else to do so. When he healed the sick, the Mosaic law was the sanitary code and the priests were health officers and quarantined infectious diseases. After the Sermon on the Mount, when he healed the leper, he said, "See thou tell no man, but go thy way, shew thyself to the priest, and offer the gift that Moses commanded, as a testimony unto them." So, if He were here today, I see no reason to doubt that he would comply with the law of the land now, as he did then.

If the physician can believe what he sees and what patients tell him, there are still many afflicted with torments of the mind and possessed by devils. The young lady who says she is "so nervous she could just scream" also states that she loves a man whom she may not marry because he is of a different faith: and the woman who tells her physician that she contemplates seeking a divorce and desires a letter stating that she is justified in such a course—both of these need the clergyman

rather than the physician. But now, as in the time of Macbeth, the physician is asked to

"* * * minister to a mind diseas'd;
Pluck from the memory a rooted sorrow;
Raze out the written troubles of the brain;
And, with some sweet, oblivious antidote,
Cleanse the stuff'd bosom of that perilous stuff
Which weighs upon the heart."

And when he replies, "Therein the patient must minister to himself," he is told to "throw physick to the dogs, I'll none of it."

But we must not forget that physical disease may be largely if not wholly the cause of abnormal mental condition and unsocial behaviour. Many of the downcast and heavy hearted are so because of physical impairment and the fretful wife or irritable husband may not be possessed by a devil, but may be suffering from no worse demon than can be extracted by a dentist's forceps. Autointoxication, focal infection and other chronic physical disorders may so impair the nervous system that the reactions will be very abnormal, and before attempting to remove an evil spirit or produce healing by an act of faith it would be well to attack the evil at its source and remedy physical conditions found to be defective.

Some one has asked, "When should the minister be called?" I would reply early and often. Not once in a lifetime and that so late that the toes are cold. Only too frequently the sequence of events is as follows: We see the physician going into the house next door and we say, "I see Mrs. Brown is ill," but we feel no apprehension. Next day, when two physicians enter the house, we say, "I fear Mrs. Brown is worse, for they are having a consultation." We feel anxiety, but still have hope. But when we see the minister leaving the house, we say, "I fear they have given up hope of Mrs. Brown for I saw the minister coming out of the house today." The sad and depressing atmosphere on such an occasion should not be charged to the minister's visit any more than the death should be ascribed to the last dose of medicine taken. Both the physician and the minister too often have to deal with an end result of events belonging to an irrevocable past.

Some people refer to the deformed and mentally defective as "the afflicted of God," thereby leaving the blame and burden to Him. The cynical Oriental poet makes the "vessel of more ungainly make" say:

"They sneer at me for leaning all awry.

What, did the hand of The Potter then shake?"

But in our day and land we believe that our vessel is subject to good and bad influences, which may be modified favorably, so we organize means for the care and education of mothers, study prenatal influences, and advocate child welfare work, the training of defectives and the reclaiming of the delinquent, considering ourselves instruments in the hands of the great Artist, to be used in shaping the vessel in symmetry and strength for beauty and service.

What should the minister do when called? This is for him to determine. To the man devoted to his calling, and possessed of the available knowledge of the material with which he must work, there is no conceivable limit to the good he may do for mankind. As its guide, philosopher and friend, his teaching should lead to wholesome living, right thinking, and self restraint. These alone would prevent many of the diseases which mar the body and cloud the mind, for "Unnatural deeds do breed unnatural troubles." There is an old writing which says, "He that sinneth in the sight of his Maker shall fall into the hands of the physician," while "length of days and long life and peace" are promised to those who "forget not the law but keep the commandments." (Ecclesiasticus 38:15.) "Hear ye children, the instruction of a father and attend to know understanding." Then, as in the olden days, the hearth will be indeed an altar, and the worthiest sacrifice to the gods the perfect physical sanity of young men and women which the scrupulous ways of pure religion tend to maintain.

But this is not easy, and so, from the childhood of the human race, mankind has sought for some royal road to wisdom and a sudden, easy, and happy issue from affliction. The idea of being healed of a mental or physical affliction by an act of faith, such as a pilgrimage to some sacred spot or the offering of a gift to some shrine, is very beautiful and appeals to something deeply implanted in all. Even the most material-minded are charmed by the new and strange and it seems good to them to leave their native city and journey to a distance, even to a foreign country, where a strange man in a novel environment may treat them, perhaps cure them, and certainly give a new name to the disease.

The earliest historical records reveal the

care of the sick in the hands of priests or priest-physicians and among the primitive people existing at present the priest is the medicine man. But even in very early times, in Egypt, India and Babylonia, there gradually grew up a body of lay physicians who dealt with disease more particularly from its physical aspects. Between them and the priests there existed in Greece the most cordial and helpful co-operation. These groups of lay physicians gradually increased in size and importance and admitted to their ranks acceptable ones who wished to become physicians. They formed schools or guilds where the theories and practice were taught by discourse and at the bedside.

It was in such an environment, near the temple of Esculapius that Hippocrates laid the foundation for rational medicine, and Galen, when a young man, served at such a temple. The modern physician who reveres the names of these fathers may well be reminded that their education was not purely technical, but that physical training was practiced for the development of the body, and rhetoric, poetry and music cultivated for the humanizing of the soul.

We see that the head hunter and South Sea Islander have their priest-medicine-man and that the cultured pagan had temples dedicated to the healing of disease. But before we encourage the modern man to expect a miraculous intervention in the laws of nature for his personal benefit it would be well to consider the physical and spiritual consequences.

Uncleanliness now, as in the days of Moses, has something to do with disease. Bad habits and the violation of the laws of physiology produce very distressing results in this world, however much the consequences may be mitigated in the world to come. But, on the other hand, by means of personal and communal sanitation, health is nowadays in a great measure a purchasable commodity, and a high typhoid rate, the prevalence of malaria, and a high death rate in general should not be blamed on God, on the local Saint or on the minister, but on the city fathers and the citizens themselves. So let us co-operate with the health officer in enforcing the laws providing for our own safety.

The man who is taught that God or the minister may cure his ills will rationally ask, "Why, then, were they not prevented?" and if

what he calls Christian Faith does not produce a remedy, he may try what someone else calls Christian Science. The steps are then short and easy to the wizard, the Ouija board and the newest novelty that promises the most for the least inconvenience. Such an one will be fickle in faith and subject to unpleasant, gusty changes of temperament. We may imagine him saying in the words of Kipling's Pagan:

"How can the skin of a rat or mouse hold
Anything more than a harmless flea?
The burning plague has taken my household.
Why have my gods afflicted me?
All my kith and kin are deceased,
'Though they were as good as good could be.
I will out and batter the family priest
Because my Gods have afflicted me."

The rational attitude of mind and one leading to more productive results is expressed in another verse:

"This was none of the good Lord's pleasure,
For the spirit He breathed in man is free;
But what comes after is measure for measure,
And not a God that afflicteth thee.
As was the sowing, so the reaping
Is now and evermore shall be.
Thou art delivered to thy own keeping,
Only thyself hath afflicted thee!"

This virile doctrine is such "strong medicine" that all will not accept it, so the miracle worker on the one hand and the scapegoat on the other will ever be the resort of the weak and timid.

In the olden days when Moses was trying to make a nation of a people who had recently been slaves, though he fed them with manna from heaven, his public cried to him for the flesh pots of Egypt, and when he came down from the mountain with the Ten Commandments for guidance and mutual protection he found them worshipping a golden calf. In modern times, the public of Metchnikoff, Pasteur and Reed will drink sour milk to prolong life, but to rout out the rats, destroy mosquitoes and flies, and keep their milk bottles clean does not appeal to the imagination, at least not to a degree sufficient to arouse enthusiasm.

If we might speak of a medical problem in terms of theology, we would say that faith is essential but faith should lead to works and the works should be "meet," that is, there should be a rational relation between the character of the works and the end desired to be accomplished.

To the observant all life is a miracle, and to the pious all healing is from God. A holy book tells us:

"The Most High hath created medicines out of the earth, and a wise man will not abhor them. Was not bitter water made sweet with wood? The virtue of these things is come to the knowledge of man, and the Most High hath given knowledge to men, that He may be honored in his wonders. By these He shall cure and shall allay their pains and of these the apothecary shall make sweet confections, and shall make up ointments of health, and of His works there shall be no end." As for the physician, " * * * * * for the Lord created him: and let him not depart from thee, for his works are necessary. For there is a time when thou must fall into his hands."

But do not expect too much of him. At best, the physician can only point out the relation between cause and effect, and with the aid of an intelligent public opinion prevent some diseases, cure some others, and fortunately, ameliorate all. Under his directions we may undoubtedly have life a little longer and, what is more important, "more abundantly," that is, live more efficiently while here. He may win many battles, but must ultimately lose the war, for to all must come the

" * * * reaper whose name is Death,
Who, with his sickle keen,
Reaps the bearded grain at a breath,
And the flowers that grow between."

The physician attempts to teach man how to live cleanly, sanely, long and usefully. Religion must show him how to meet irretrievable loss and death.

"In the hour of death, after this life's whim,
When the heart beats low, and the eyes grow dim,
And pain has exhausted every limb,—
The lover of the Lord shall trust in Him.

When the will has forgotten the lifelong aim,
And the mind can only disgrace its frame,
And a man is uncertain of his own name—
The power of the Lord shall fill his frame.

When the last sigh is heaved and the last tear shed,
And the coffin is waiting beside the bed,
And the widow and child forsake the dead,
The angel of the Lord shall lift his head.

For even the purest delight may pall,
And power must fail and the pride must fall,
And the love of the dearest friends grow small—
But the glory of the Lord is all in all."

*Anonymous,
(Oxford Book of Verse.)*

1720 Connecticut Avenue.

THE CONSERVATION OF LIFE.*

By R. H. GARTHRIGHT, M. D., Vinton, Va.

The soundest and healthiest body is the one most capable of performing useful mental and physical work.

Few men are perfect. For one who is strong and virile, there are many weaklings. Stand on the street corner, if you please, and study the passing crowd. The pale and pinched faces, the limping gait, the stooped shoulders and contracted chests, prove the truthfulness of this assertion.

Men do not realize what a great privilege it is to be alive. Deaths are entirely too frequent. Hundreds of thousands cease to exist long before attaining their majority; millions "pass over the river" in the meridian of life, and few reach the allotted "three score years and ten." Drink, abuse of the digestive organs, impurity, unnecessary exposure to contagious diseases, and excesses that cripple the heart and kidneys, send them down to untimely graves.

Nature is a fighter. The law of antithesis is a natural law. We know that two forces are continually at work in the body of every creature: the one endeavors to keep it alive, the other to kill it.

Because men fail to appreciate the value of life, sooner or later they suffer.

"Fools, because of their transgression and because of their iniquities are afflicted." How long the vital principle will be retained in the material parts is often dependent upon the individual's volition. A man may possess perfect organs, functioning physiologically, the light of life ablaze throughout his complex organism, and still be inclined to abuse the "tenement of clay." He may will to yield to appetite until his material parts are wrecked beyond restoration.

No man comprehends the height and depth, the length and breadth of this marvelous principle denominated life. With it the whole creation teems and throbs. It breaths upon the earth, and fields of green and flowers of varied hues appear; and other things come forth to please the eye and delight the ear with beauty and with melody. It glows upon the cheeks of maidens, gives strength and grace to the forms of men, converts the inorganic into the organic, makes flesh and bone and brain from senseless dust. It dwells in

the tiny blade of grass and in the cedars of Lebanon, the earth worm in its feebleness and Behemoth in his might.

Let me venture a definition of human life. It is that invisible force which sensitizes and prepares the organs for the reception of impressions, making man capable of seeing, hearing, feeling, thinking and working. Dr. William E. Munsey, defines it, "An invisible, imponderable, intangible, immaterial energy."

This energy permeates every cell of the organism. It accumulates in the ganglia, shoots along the nerve fibers throughout their ramifications, stimulates the blood currents, the respiration and the elimination of waste products. It touches and revivifies organs that are about to perish: thus restoring the physiology of tissues on the border of pathological decay. From occipito-frontalis to plantar fascia, into the recesses of every nook and corner of man's anatomy, its light and power penetrate. Into the hundreds of bones, cartilages and muscles, the skin, the brain with its fissures and convolutions, its hallways and apartments curtained by soft and delicately woven tissue—into all these it enters to assist in balancing and harmonizing the body's organs. It is this energy, aided by other forces, which brings together the various atoms, resulting in the formation of compounds, that uniting, make man a conscious, active being.

This principle manifests itself in the embryo. Then the mystery of reproduction goes on until all the organs are formed and a human being, endowed with an immortal soul, is ushered into the world. To wantonly destroy a life in its incipency, is "murder most foul and damnable." If all men and women of sound minds and bodies would organize for the purpose of studying the laws of life preservation, pledging themselves to the strict observance of the same, coming generations would be stronger and happier.

One way in which lives can be saved and health preserved is by a systematic distribution of doctors. The average Virginia city contains a plethora of physicians, the average country community contains a paucity. Indeed the condition is so serious that medical men need to be offered special inducements to locate in the country. Strong and progressive men should practice in rural districts. Health conditions will improve and the mortality

*Read before the Roanoke Academy of Medicine, October 16, 1922.

rate decrease perceptibly when country work is given more thorough and systematic attention by the profession.

The introduction of automobiles stimulates the building of good roads through sections formerly inaccessible. With traveling on smooth highways in vehicles that save time, there will come many rural improvements, better houses, better school facilities, better land producing better crops, and better sanitation, and with doctors more accessible, life's conservation will be greater.

With one or more small hospitals established in every county, chemists, bacteriologists, physicians and surgeons can give almost ideal service to the rural population without the danger and time required to move patients' long distances to hospitals in the cities.

Statistics show that seventeen thousand parturient women die annually in the United States, and approximately, two hundred and fifty thousand babies die before they reach the age of one year. In our own state the report of the Health Board shows that three times as many mothers succumb to child-birth as would if they were properly cared for. Prospective mothers' lives are sacrificed because they neglect to receive treatment at the critical period.

In the county of Pittsylvania under the supervision of Dr. W. P. Caten, there were 5,978 school children inspected, 1353 of whom had defects of vision, 546 beginning to be deaf, 2214 enlarged tonsils, 1091 adenoids, 4,609 decayed teeth, and out of 1,847 children examined for hookworms and other parasites, 356 had hookworm, showing an aggregate of 10,169 defects. Isn't that alarming for a single community? It exists perhaps almost as bad over the entire state and country.

An evil abounds that is wrecking the health and destroying the ability of many. I refer to the drug habit. The Harrison Act does not seem to be diminishing the number of addicts, for it is said that there are more than one million in this country. Half of them are women. Lemuel L. De Bro believes these sufferers should be treated in well appointed hospitals. Sad it is to know that there are unscrupulous men and women going up and down the land selling morphine and cocaine to these weak and miserable creatures. Can it be that some members of our exalted profession are so degraded in mind and morals as to become engaged in this hellish traffic?

Lord have mercy on them, and bring them back to a state of decency!

The Doctor should watch his middle-aged patients and have them undergo a thorough examination once or twice a year. He will often find beginning organic diseases which, if attended to in time, will lengthen life. Heart, lungs, and kidneys are often crippled before their owners suspect they are diseased.

The cancer problem needs to arouse the active interest of every member of the profession. This insidious disease continues to destroy tens of thousands annually. The people ought to be taught how to recognize its incipient symptoms, and submit to the X-ray, radium, or surgical treatment before it advances beyond the curative stage.

Why is it that we have so few cases of typhoid fever to treat today? Because health boards and family physicians have taught them how to prevent it.

How is it that so many children still acquire measles? Because we have not impressed the heads of households with its dangers. The idea exists that measles and whooping-cough must at some time attack every body, and mothers wishing to have it over with actually make no efforts at prevention.

One of the greatest hindrances to progress along this line is the blind submission of hundreds to the methods of the numerous medical cults that are continually springing up in every quarter. Our convalescent patients are persuaded to submit to their manipulations, and then if by chance improvement continues, they proclaim through the press, and with loud voices, their marvelous success! And people believe them and crowd their offices. Special bills are passed by legislatures and approved by governors permitting *poropaths*, *chiropractics*, cancer quacks, D. C.'s, C. Q.'s, *et cetera*, to practice on the bodies of human beings without submitting to examination before the State Boards. Who is responsible for this condition? The problem is unsolved. Our efforts to protect the people from quacks do not seem to be appreciated and sometimes we are tempted to say, "Ephraim is joined to his idols, let him alone." But while we feel this way, really we should redouble our efforts to eliminate medical pretenders and thus fight unceasingly for the protection of the ignorant and thoughtless.

Perhaps the most effectual as well as the

most ghastly and rapid example of plague extermination in history is described in the Book of Numbers. The children of Israel committed whoredom with the Midianitish women at Beth Peor. Soon syphilis ran riot among the hosts, and many died with the disease. Terrific battles were fought and thousands killed and cities destroyed. Israel returned with the spoils of war and captured women. Moses' wrath was kindled, and he ordered the slaughter of every woman who had known man and all the men who had cohabited with women. The slaughter was terrible, but it saved the nation. Israel was cleansed of the plague and the taint ceased to be transmitted.

Dr. Thomas W. Murrell, of Richmond, says, "He, (Moses) looked down on the ages. He was as surely protecting the Hebrew boy and girl playing on the steps of Solomon's Temple, and the men and women who gathered in the stable at Bethlehem, as those who now sleep under the stars by Jordan." That was indeed radical treatment. How would Dr. Moses handle the situation today?

Impress the young with the importance of life's conservation and good results will follow. "The seeds of first instruction are dropped into the deepest furrows." If future generations are to be healthy and wise, the living youths of today must absorb and demonstrate these lessons.

The preservation of health and the prolongation of life should constantly occupy the mind of the doctor. The various methods of helping the individual to keep his physical parts in good working condition should be daily impressed upon his mind by the family physician. Health Boards are accomplishing a great deal, but more satisfactory results would be in evidence if they received the full co-operation and help of doctors in general practice. Life is tenacious and persevering. Since the dawn of history it has met various antagonistic forces. War and pestilence have driven out the vital spark from the bodies of millions, but other sentient beings have quickly taken their places.

Periods of cessation from wholesale turmoil and destruction have obtained, and prosperity returned. But for its wonderful tenacity and revivifying properties, dire destruction would quickly come to a large portion of the earth's inhabitants.

Look at France: Charles IX, Catherine de Medici, Louis XIV, and Napoleon Bonaparte kept its soil deluged with blood through long years; but from the almost chaotic condition to which that fair land was reduced, living men and women bestirred themselves, and speedily rebuilt the nation.

Permit me to say that in our observations on life we, as men who are somewhat scientific, should seek to avoid conversion to the ideas of those scientists who see nothing immaterial in man, but rather look upon the human frame as composed of body and soul, one part of which parallels eternity. The thought of death is repugnant; as expressed by Charles Lamb, "We do not want to go down into the cold and muddy grave even though we have kings and princes for our bed fellows."

"Cold in the dust the silent heart may lie,
But that which warmed it once can never die."

In the beautiful drama of Ion, the instinct of immortality so eloquently uttered by the death-defying Greek finds a deep response in every thoughtful soul. When about to yield his young existence as a sacrifice to fate, his beloved Clementhe asks if they shall not meet again; to which he replies "I have asked that dreadful question of the hills that look eternal, of the clear streams, flowing forever, of the stars among whose fields of azure my raised spirit hath walked in glory. All were dumb, but while I gaze upon the *living* face, I feel that there is something in the love that mantles through its beauty that cannot wholly perish. We shall meet again, Clementhe."

The fear of what will come after death induces some men to observe hygienic rules, and thus prolong their earthly existence. Shakespeare has this idea in mind when he writes:

"For in that sleep of death what dreams may come
When we have shuffled off this mortal coil,
Must give us pause.

For who would bear the whips and scorns of time,
The oppressor's wrong, the proud man's contumely,
The pangs of despised love, the law's delay,
The insolence of office, and the spurns
That patient merit of the unworthy takes
When he himself might his quietus make
With a bare bodkin?

Who'd these fardels bear,
To grunt and sweat under a weary life,
But that the dread of something after death,
The undiscovered country from whose bourne
No traveler returns, puzzles the will,
And makes us rather bear those ills we have,
Than fly to others that we know not of?"

Sometimes when we think of present con-

ditions, of the men who are disregarding the rules of decency and the laws of the land, of the large number of children appearing daily in our juvenile courts, of the unrest in Europe and other foreign countries, the degrading, inhuman outrageous actions of the bloody Turks, we are inclined to view the future with a feeling of dread. But if we will consider what has been done by determined and optimistic workers in the midst of distressing conditions in the past and realize what many are doing to uplift humanity today, we will not despair, but will be encouraged for the future. I believe that life is too powerful and man too far advanced in civilization to retrograde—that individuals are going to increase in mental and physical vigor, nations move on towards perfection, and universal justice prevail.

Sitting in my office not long ago and thinking over these questions, I looked at some of the pictures on the wall. Before my eyes were the fine and noble features of Gen. Robert E. Lee, the great soldier, the matchless leader of men, the splendid teacher of youth, the Christian gentleman, who wore always the "white flower of a blameless life;" an engraving of John W. Daniel, the statesman and Virginia's gifted orator, the great constitutional lawyer, the honest man; another picture—the first meeting of the Medical Society of London in 1773, composed of prominent physicians and surgeons of the day, who wrought to benefit their kind. In the group is seen the modest face of Jenner whose discovery has saved the lives of multiplied thousands. Then I looked at the features of a brave young soldier who fought in France for his native land and for the world's freedom. There was also a photograph of the cottage home of a superannuated Methodist preacher. Standing in the front yard by the fence, leaning on his staff, is the preacher himself, gray headed and bent with age, realizing the sweet consciousness of duty done, who has "fought a good fight" and almost "finished his course," calmly awaiting the call to his eternal reward. And I felt that there are still many men and women faithful and true, in every section of our beloved land, preaching the gospel of health, and unselfishly working with all their powers to strengthen character and uplift humanity.

Let us hope that the time will come, and come soon, when wars will cease, contagious

and infectious disease be conquered, and Hygeia, robed in garments of spotless purity, will walk in queenly strength and dignity through all the lands of this big round world.

THE ETIOLOGY OF BENIGN STRICTURE OF THE ESOPHAGUS.

By PORTER P. VINSON, M. D., Rochester, Minnesota.
Division of Medicine, Mayo Clinic.

Approximately eight per cent of esophageal obstructions are due to cicatricial stricture. Most such strictures are the result of ingesting caustics, usually a solution of lye, but a fairly large number are caused by other factors. The strictures that follow the swallowing of lye are most common in children, but those due to accidental burns from this caustic and from swallowing it in attempts at suicide are often seen in adults. A patient who has had such an accident in childhood occasionally is able to swallow with comparative comfort until adult age, when a bolus of poorly masticated food, usually meat, may lodge in the esophagus above the stricture. In removing this bolus, sufficient traumatic edema may be produced to cause complete esophageal obstruction. During the past two years, thirty-seven patients with benign stricture of the esophagus have been observed in the Mayo Clinic. I shall discuss these cases from the standpoint of etiology.

Nineteen of the thirty-seven patients had strictures resulting from the ingestion of a solution of lye. Eleven of these had swallowed the lye before they were ten years of age, but two of them were more than fifty years before they came for examination. Eight of the patients were adults, four of whom had attempted suicide, and four had swallowed the solution accidentally. One stricture in an adult had been caused by the accidental swallowing of a solution of silver nitrate in infancy. Hydrochloric and sulphuric acids had been responsible for three of the strictures seen in adults. One of these resulted from an attempt at suicide.

One patient aged seventy-five years had had a thrush infection four years before, and a stricture in the upper portion of the esophagus was attributed to the effects of the disease. Scarlet fever was the etiologic factor in two cases, and in one other, the stricture had followed an attack of typhoid fever. Three of the strictures had occurred during pregnancy and were evidently the result of ulceration

of the esophagus caused by pernicious vomiting. Seven of the patients had strictures for which no cause could be ascertained. They had evidently resulted from a mediastinitis, or from the healing of a simple ulceration in the esophagus.

SUMMARY

Of thirty-seven patients having benign strictures of the esophagus, twenty-three had acquired them after eighteen years of age. The remaining fourteen strictures had occurred in patients under ten years of age.

Five of the strictures seen in adults had resulted from unsuccessful attempts at suicide.

Of the strictures that had occurred in childhood, eleven had resulted from lye, two followed scarlet fever, and one was caused by the ingestion of a solution of silver nitrate.

Twenty-three strictures observed in adults were produced by the following causes: eight from the swallowing of lye, three from the vomiting of pregnancy, two from the ingestion of hydrochloric acid, one from sulphuric acid, one from thrush, one followed typhoid fever, and in seven the cause could not be determined.

Proceedings of Societies

Wise County Medical Society.

At the meeting held in Norton, June 27, papers were presented by Mr. Aubrey H. Straus, director of the State laboratory, on "Diphtheria Immunization;" by Dr. Thomas F. Staley, Bristol, on "Eye Strain and Results of Accurate Refraction;" and by Dr. C. B. Bowyer, Stonega, on "House Fly." Meetings are held bi-monthly and are interesting and well attended.

Officers elected for the ensuing years are Dr. W. G. Painter, Big Stone Gap, president, and Dr. C. B. Bowyer, Stonega, secretary (re-elected).

The Southside Virginia Medical Association

Met in Lawrenceville, June 12, with a full attendance, Dr. W. C. Harmon, of Dolphin, presiding. The program was unusually good and the free discussion which followed each paper showed that the doctors of our territory are taking much interest in the newer things in medicine and surgery.

The next meeting will be held in Emporia in September.

R. L. RAIFORD, Sec'y.

The Norfolk County Medical Society,

At its annual meeting in June, elected Dr. Charles W. Doughtie president; Dr. R. L. Payne, vice-president; and, re-elected Dr. Lockburn B. Scott, secretary-treasurer. All are of Norfolk.

The Southampton County Medical Society

Held its regular monthly meeting in Courtland, June 7, with a full attendance. Mr. Aubrey H. Straus, State Bacteriologist, had charge of the program, and talked on the Schick test and the administration of toxin-antitoxin. Several children with typical Schick reactions were exhibited and some of the doctors present took the test at the close of the meeting.

The Truth About Medicine

During May, the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

Connaught Antitoxin Laboratories

Insulin-Toronto

Insulin Toronto—5 c. c. vials, 5 units in each cubic centimeter.

Insulin-Toronto—5 c. c. vials, 10 units in each cubic centimeter.

Mallinckrodt Chemical Works

Arsphenamine-Mallinckrodt

Arsphenamine-Mallinckrodt Ampoules, 0.1 Gm.

Arsphenamine-Mallinckrodt Ampoules, 0.2 Gm.

Arsphenamine-Mallinckrodt Ampoules, 0.3 Gm.

Arsphenamine-Mallinckrodt Ampoules, 0.4 Gm.

Arsphenamine-Mallinckrodt Ampoules, 0.5 Gm.

Arsphenamine-Mallinckrodt Ampoules, 0.6 Gm.

Arsphenamine-Mallinckrodt Ampoules, 1.0 Gm.

Barbital—M. C. W.

Cincophen—M. C. W.

Mercuric Cyanide—M. C. W.

Quinine Ethylcarbonate—M. C. W.

Parke Davis & Co.

Pollen Extract Ragweed—P. D. & Co.

Pollen Extract Timothy—P. D. & Co.

Nonproprietary Article

Insulin.

PROPAGANDA FOR REFORM.

The intracardiac injection of epinephrin.—Recently much publicity has been given to the power of epinephrin, when injected into the heart, to produce a response resulting in revivification when the heart has apparently ceased its action from certain causes. Of the many cases which have been reported, a remarkable one is that in which collapse occurred during an examination for extra-uterine pregnancy. After other methods had been tried without avail, an intracardiac injection of epinephrin was given. In ten seconds the heart sounds became perceptible. Four weeks later the patient was discharged as well. It must be borne in mind that the instances in which such restoration can be utilized are rare.

When death comes as the result of the wearing away of tissues, as the result of toxic action of either bacterial or metallic poisons, or as the result of destruction of vital organs, it would be cruel and futile to arouse false hopes by what could only be a sensational experiment. (Jour. A. M. A., May 5, 1923, p. 1314).

Intravenous therapy.—For some years the Council on Pharmacy and Chemistry has urged conservatism in the adoption of the intravenous method of administering drugs. It has been necessary to do this to offset the propaganda of proprietary firms that, for commercial purposes, feature the indiscriminate use of intravenous therapy. In order that the status of this form of drug administration might be presented to the profession, and that it might be made clear under just what conditions the intravenous administration of drugs is warranted, the Council publishes a report prepared by a committee which studied the problems involved. The report discusses the fallacy of the arguments commonly advanced by those who advocate intravenous therapy as a routine. The Council has no desire to discredit the rational use of drugs by intravenous injection, but, on the contrary, it seeks to avoid the accidents and disappointments that must follow the abuse of a method which, rightly employed, may be a life-saving measure. The Council places itself on record as opposing the reckless and indiscriminate use of drugs by intravenous injection with its attendant dangers and increased needless expense to the patient. However, the Council recognizes the legitimate, life-saving nature of the intravenous administration of drugs in extreme cases. (Jour. A. M. A., May 5, 1923, p. 1331).

Fleischmann's Yeast not admitted to N. N. R.—In March, 1921, the Council on Pharmacy and Chemistry took up the consideration of Fleischmann's Yeast on account of the extensive and extreme therapeutic claims which were made for this preparation. Since then the Council has given much attention to the subject of yeast therapy. After consulting with eminent students of nutrition and clinicians qualified to speak with authority on questions of nutrition, dietotherapy and pediatrics, the Council concluded that there was little likelihood that the administration of yeast or yeast preparations will be of therapeutic value in many cases for which they are advised. The Council finds that many advertisements for Fleischmann's yeast are misleading in that they tend to create the belief that many diseases are prevented or cured by its use. Advertisements addressed to physicians are likely to lead to the belief that the efficacy of yeast therapy in many conditions has been established. Advertisements addressed to the public are bound to create the opinion in the mind of the lay reader that reliance may be placed on yeast in many conditions. The Council refused recognition to Fleischmann's Yeast (1) because it is advertised by means of unwarranted and misleading therapeutic claims, and (2) because it is advertised to the public with unwarranted therapeutic claims that may become a detriment to the public health. (Jour. A. M. A., May 12, 1923, p. 1398).

The Standardization of Pituitary Extract.—Pituitary extract—a solution containing the water soluble principle or principles from the fresh posterior lobe of the pituitary body of cattle—is official in the U. S. Pharmacopeia as Solution of Hypophysis, and a method of standardization is prescribed. In practice the pharmacopeial standard has been found unreliable and manufacturers have adopted various modifications. Further, the pharmacopeial solution has been found too weak, and stronger preparations

are being marketed. Some of these have been accepted for New and Non-official Remedies. The wide variation in the strength of pituitary extracts and the unsatisfactory character of pharmacopeial assay method are shown in a study carried out by Erwin E. Nelson, and a study by Morris I. Smith and Wm. D. McKlosky. The next pharmacopeia should provide a pituitary solution of satisfactory strength and an assay method which will insure a satisfactory control of this important medicament. Until such a standardization is provided, the physician will do well to use one of the pituitary preparations accepted for New and Non-official Remedies, which he has found to be satisfactory. (Jour. A. M. A., May 19, 1923, p. 1473).

Tryparsamide.—The Council on Pharmacy and Chemistry publishes a preliminary report on the experimental status of Tryparsamide. The drug is an arsenical developed in the Rockefeller Institute for Medical Research. Pending the outcome of clinical studies, the substance is not offered for sale. Tryparsamide is primarily a trypanocidal agent, but it possesses some spirocheticidal activity. It is said to produce "tonic" effects. It is proposed for use in the treatment of trypanosomiasis, syphilis of the central nervous system and late stages of syphilis with inactive or indolent lesions, and it is said to be specially indicated in the treatment of cachectic individuals. The Council states that the favorable reports of the effect of Tryparsamide on trypanosomiasis and neurosyphilis appear to warrant controlled trials of the drug in these conditions, but also warns that the possibility of harm to vision must be given due consideration. The Council postponed the acceptance of Tryparsamide for New and Non-official Remedies until its therapeutic value and safety are established, and until it is on the market. (Jour. A. M. A., May 26, 1923, p. 1521).

Book Announcements

Cerebrospinal Fluid in Health and Disease. By ABRAHAM LEVINSON, B. S., M. D., Associate in Pediatrics, Northwestern University Medical School; Attending Physician, Department of Contagious Diseases, Cook County Hospital, Chicago, etc. With a Foreword by LUDVIG HEKTOEN, M. D. Second Edition, thoroughly revised. St. Louis. C. V. Mosby Company. 1923. 267 pages with sixty-nine illustrations, including five color plates. 8vo. Cloth. Price \$5.00.

New and Nonofficial Remedies 1923 Containing Descriptions of the Articles which Stand Accepted by the Council on Pharmacy and Chemistry of the American Medical Association on Jan. 1, 1923. Cloth. Price, postpaid, \$1.50. Pp. 415+XXXVI. Chicago: American Medical Association, 1923.

New and Nonofficial Remedies is the publication of the Council on Pharmacy and Chemistry through which this body annually presents the American medical profession with disinterested, critical information about the proprietary medicines which are offered to the profession, and which the Council deems worthy of recognition. In addition to the descriptions of proprietary preparations, the book contains descriptions of those nonofficial

remedies which the Council deems deserving of consideration by the profession.

A valuable feature of the book is the grouping of preparations in classes. Each of these is introduced by a general discussion of the group. Thus the silver preparations, the iodine preparations, the arsenic preparations, the animal organ preparations, the biologic products, etc., each is preceded by a general, thoroughly up-to-date discussion of the particular group. These general articles compare the value of the products included in the group with similar pharmacopeial and other established drugs which it is proposed that these proprietary preparations shall supplant.

The preface of this volume shows that the book has been extensively revised.

Physicians who wish to know why a given proprietary is not described in New and Non-official Remedies will find the References to Proprietary and Unofficial Articles not found in N. N. R. of much value. In this chapter (in the back of the book) are given references to published articles dealing with preparations which have not been accepted.

New and Nonofficial Remedies should be in the hands of all physicians who prescribe drugs. The book contains information about the newer materia medica which cannot be found in any other publication.

Epidemiology and Public Health. A Text and Reference Book for Physicians, Medical Students and Health Workers. In three volumes. By VICTOR C. VAUGHAN, M. D., LL.D., Emeritus Professor of Hygiene in University of Michigan, Assisted by HENRY F. VAUGHAN, M. S., DR. P. H., Commissioner of Health of City of Detroit, and GEORGE T. PALMER, M. S., DR. P. H., Epidemiologist for Department of Health of City of Detroit Vol. II. **Nutritional Disorders. Alimentary Infections. Percutaneous Infections.** St. Louis. C. V. Mosby Company. 1923. 8vo. 917 pages. Cloth, \$9.00.

The Tonsils. Fauical, Lingual, and Pharyngeal. With Some Account of the Posterior and Lateral Pharyngeal Nodules. By HARRY A. BARNES, M. D., Instructor in Laryngology, Harvard Medical School; Laryngologist, Massachusetts Charitable Eye and Ear Infirmary, and Massachusetts General Hospital, etc. Second Edition. St. Louis. C. V. Mosby Company. 1923. 8vo. 217 pages. Illustrated. Cloth, \$5.00.

Tonsillectomy. By Means of the Alveolar Eminence of the Mandible and A Guillotine. With a Review of the Collateral Issues. By GREENFIELD SLUDER, M. D., F. A. C. S., Clinical Professor and Director, Department of Rhinology, Laryngology and Otology, Washington University School of Medicine, St. Louis, Mo. St. Louis. C. V. Mosby Company. 1923. 8vo. 176 pages, with ninety illustrations. Cloth, \$5.00.

A Text-Book of Therapeutics. Including the Essentials of Pharmacology and Materia Medica. By A. A. STEVENS, A. M., M. D., Professor of Applied Therapeutics, University of Pennsylvania, Philadelphia. Sixth Edition, entirely reset. Philadelphia and London. W. B. Saunders Company. 1923. 8vo. 793 pages. Cloth, \$6.25 net.

Regional Anesthesia. Its Technic and Clinical Application. By GASTON LABAT, M. D., Lecturer on Regional Anesthesia at New York University and Bellevue Hospital Medical College; Laureate of the Faculty of Sciences, University of Montpellier; Formerly Special Lecturer on Regional Anesthesia, The Mayo Foundation, University of Minn. With a Foreword by WILLIAM J. MAYO, M. D. Philadelphia and London. W. B. Saunders Company. 1923. 8vo. 496 pages with 315 original illustrations. Cloth, \$7.00 net.

Transactions of College of Physicians of Philadelphia. Third Series. Vol. LXIV. Philadelphia. Printed for the College. 1922. 567 pages.

Catalogue of Macmillan Publications And Importations. May, 1923. The Macmillan Company, 64-66 Fifth Avenue. New York. Part I, 141 pages, Publications alphabetically arranged under authors' names; Part II, 28 pages, Series, with titles included in each; Part III, 97 pages, Publications classified by subjects.

Permanent T. B. Clinic Established in Loudoun County.

A permanent tuberculosis clinic has been established in Loudoun County, Va., through the efforts of the county branch of the Virginia Tuberculosis Association. It will be conducted in conjunction with the county health department, directed by Dr. P. M. Chichester, formerly of the Richmond Health Bureau, who was several months ago appointed county health officer of Loudoun County, with headquarters in Leesburg. Dr. H. A. Latane, of Alexandria, is acting as clinician at this clinic.

The U. S. Civil Service

Announces open competitive examinations for Junior Medical Officer (Pathologist), \$2,000 a year, and Junior Medical Officer (Assistant Anesthetist), \$1,000 a year, the receipt of applications to close July 24; also for Junior Pathologist at an entrance salary of \$1,500 a year, this examination to be held throughout the country July 25. In addition to the basis salary, appointees may be allowed the increase of \$20 a month granted by Congress for all positions.

Full information and application blanks may be obtained from the U. S. Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. civil-service examiners at the post-office or customhouse in any city.

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Editorial

Cerebrospinal Considerations.

Internal medicine greets with a high degree of interest the recent reports¹ in the current medical publications of the apparent success of a new drug-treatment of paresis. If a discovery of a drug, innocuous in its effect upon the body but highly noxious to the etiologic factor in this dread disease, has been made, another mile-post has been reached on the road of therapeutic conquests over syphilis-manifestations in the nervous system. Internal medicine must await further experiments and experiences with the new "arsenical," before accepting as final the favorable results of this recent work.

It seems worth while to remark upon the simplicity of the method. Every effort that results in simplifying both scientific inquiry and scientific treatment naturally, in these times of multiplicity and intricacy of the elaborate diagnostic side of medicine, elicits the favor of clinicians everywhere. This is particularly true in the instance of cerebrospinal therapy. Attempts at simplification and improvement in the treatment of cerebrospinal diseases justly claim the appreciative attention of medical men of every sort and location. Since the days of Swift-Ellis (1912), this subject has been widely investigated and only a partial success has attended the methods heretofore elaborated in the treatment of paresis. This new method leaves the

intraspinal route and relies on the intramuscular injection of the drug and its penetration to the cerebrospinal fluid. If this proves to be effective, a decided advance has been made.

The necessity of intraspinal treatment of meningococcic meningitis, of pneumococcic meningitis, of streptococcic meningitis, of tubercular meningitis, of poliomyelitis, and of tetanus by sera makes the study of therapy by the spinal canal route extremely important, to say nothing of the study of the cerebrospinal fluid for diagnostic purposes. So that in our brief mention of new treatment for cerebrospinal syphilis, we shall call attention to some considerations now commonly used by clinicians in dealing with both the therapy and diagnosis of diseases related to the spinal fluid.

CEREBROSPINAL FLUID

The anatomy and physiology of the cerebrospinal fluid, in relation to the ventricles of the brain, the chorioid plexus and subarachnoid spaces, is of interest in this connection. Levinson² in his book, second edition, points out with clearness the following interesting facts:

1. "The cerebrospinal fluid is contained in the ventricles and the subarachnoid space of the brain and cord.

2. "There is a free communication between the fluid contained in the ventricular system and the fluid in the subarachnoid spaces of the brain and cord.

3. "The cerebrospinal fluid has a circulation.

4. "The rate of formation of normal fluid is unknown: likewise is the rate of absorption.

5. "Absorption seemingly takes place by a process of diffusion from the subarachnoid space of the brain and of the cord. Some absorption also takes place by the lymphatics draining into the deep cervical glands, into the lymph vessels of the nose, perilymph spaces of the labyrinth and into the perineural sheaths of the cranial nerves.

6. "The meninges and the chorioid plexus are not permeable, or very little so, under normal conditions.

7. "The fluid exerts a mechanical function in that it equalizes the cerebrospinal pressure. The numerous other functions attributed to the fluid need further substantiation.

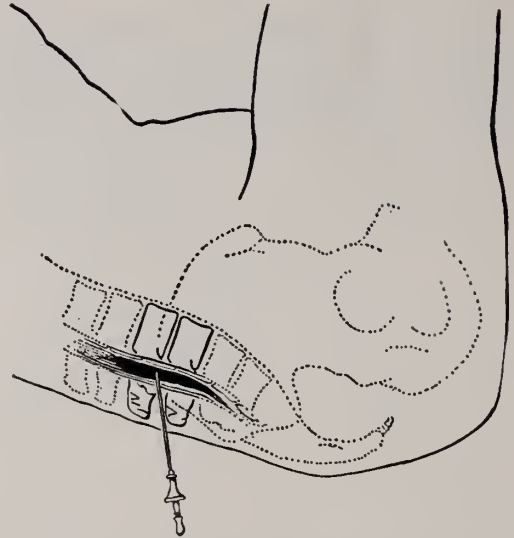
1. Lorenz, W. F. and others. J. A. M. A., Vol. 80, No. 21, page 1498, and Vol. 80, No. 22, page 1620.

2. Cerebrospinal Fluid in Health and Disease, by A. Levinson, B. S., M. D. C. V. Mosby Company, St. Louis, 1923.

8. "The origin of cerebrospinal fluid is unknown. There is some evidence pointing toward the theory that the chorioid plexus is the seat of origin of the fluid. There is also evidence pointing to the assumption that the fluid is a direct product of the blood or the brain tissues."

LUMBAR PUNCTURE

From the day of Quincke (1891) to the present time, lumbar puncture for diagnostic and therapeutic purposes has held the interest of the medical profession. Always the removal of the spinal fluid by lumbar puncture should be made only when strongly indicated and should be considered an operative procedure in internal medicine for the purposes of diagnosis or treatment. It is not a measure that should be instituted without careful consideration and without adequate experience; on the other hand, it is a procedure of diagnosis and treatment that should be em-



Lumbar puncture. Introduction of the needle when the patient is in the sitting position. (From Barker's Clinical Diagnosis of Internal Medicine. Vol. I, pg. 73).

ployed where and when indications are positively for it. Therapeutically, lumbar puncture may be performed for the relief of intracranial pressure in hydrocephalus, delirium tremens, eclampsia, encephalitis, for the introduction of serum in meningococcic meningitis and for the intraspinal treatment of cases of neurospinal syphilis. For diagnosis, lumbar puncture may be performed in cerebrospinal syphilis, hemorrhage of the brain, tumors of the cord, poliomyelitis, and meningitis.

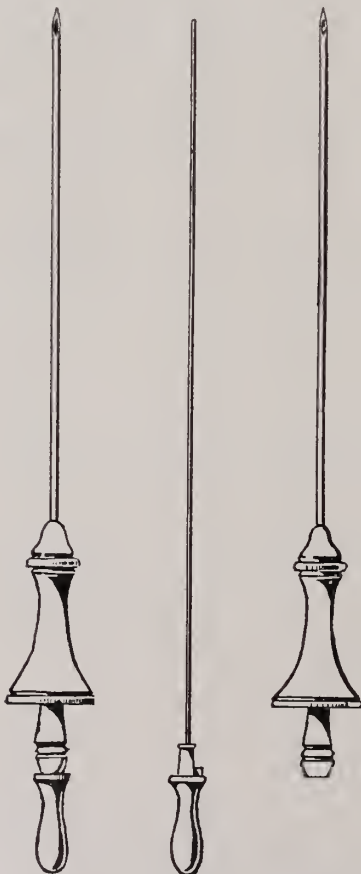
Levinson has summarized the following conditions for the use of the lumbar puncture:

In diagnosis,

1. Suspicious meningitis.
2. Suspicious poliomyelitis.
3. Hemorrhage of the brain.
4. Neurosyphilis.
5. Coma.
6. Convulsions.

In treatment,

- I. For relief of intracranial pressure
 - (a) Meningitis.
 - (b) Meningism.
 - (c) Poliomyelitis.
 - (d) Encephalitis.
 - (e) Hemorrhage of brain.
 - (f) Delirium.
 - (g) Convulsions.



Trocar for lumbar puncture showing the stylet in place, and withdrawn. (From Barker's Clinical Diagnosis of Internal Medicine. Vol. I, pg. 72).

II. For intraspinal injection in serum treatment

- (a) Antimeningococcus.
- (b) Pneumococcus serum Type I.
- (c) Influenza.
- (d) Poliomyelitis.
- (e) Tetanus antitoxin.
- (f) Horse serum.

In chemical treatment,

- (a) Neosalvarsan.
- (b) Mercury.
- (c) Optochin (ethyl cuprein hydrochloride).
- (d) Magnesia sulphate.
- (e) Novocaine.
- (f) Adrenalin.
- (miscellaneous) general edema, diabetes insipidus, uremia.

CONTRAINDICATIONS AND EFFECTS OF LUMBAR PUNCTURE

In tumors of the cerebrum and cerebellum, lumbar puncture is contraindicated. Sudden death may result when it is employed in these conditions. Lumbar puncture should not be performed on patients with infections of the skin over the region of the lumbar spine. In such cases as erysipelas, or exanthematous infections over this area, the risk of infecting the cerebrospinal canal is great. The routine use of the lumbar puncture may be practiced in cases indicating its use, but a certain skill is necessary and the procedure should be employed only under favorable conditions. The following cautions should be observed by clinicians:

- (a) In patients highly nervous, gas anesthesia may be better than local anesthesia.
- (b) The strictest sterilization of the instruments and field of operation should be made.
- (c) If possible, the patient should be in lateral recumbent position on left side. The sitting position should be avoided. Death has occurred as a result of the patient being in a sitting or erect position.
- (d) The patient should remain in bed, with head on level with the body, for at least twelve hours following the puncture.
- (e) Caution should be exercised in the rapidity and in the amount of fluid removed; small amounts of fluid should be removed, except in meningitis.
- (f) Headache and insomnia resulting from the procedure may be relieved by codein.

The marked relief derived by the removal of excess of cerebrospinal fluid in meningitis, in pneumonia, in influenza with meningeal complications, is immediate often times. One patient seen in consultation during the influenza epidemic (1918), with violent delirium and other meningeal symptoms, was instantly relieved by the removal of the fluid taken for diagnostic purposes. Upon entering the canal, the fluid was found under high pressure and in great excess. Considerable amount was removed with the above noted result.

TRYPARSAMID AND ITS PENETRATION INTO THE SPINAL FLUID

Tryparsamid, the sodium salt of N-phenylglycinamid-p-arsonic acid, has been observed experimentally in animals infected with trypanosomes and with spirochetes of relapsing fever and of syphilis. From the experimental work done on animals and on patients, it has been found that a single dose of tryparsamid, up to 5 grains, can be given with safety to the patient. In some cases, the transient disturbance of vision is observed, however.

The use of the drug has caused old and indolent lesions of syphilis to disappear; has changed a positive Wassermann reaction to negative.

The use of tryparsamid in syphilis has been adopted not because of its spirocheticidal action, for this is quite weak, but because of its unusual "toxicologic and therapeutic action observed in experimental animals, such as the promptness of recovery from toxic injury, tolerance to repeated doses, a marked tonic effect, and the ability of the drug to induce resolution and healing of syphilitic lesions, even the presence of actively motile spirochetes, but without increasing the liability of the occurrence of a general disease."*

In addition to the above noted findings, its use in syphilis of the central nervous system has been especially favorable because of the apparent revelation that the drug appeared to possess "an affinity for the tissues of the central nervous system." Further, it has been learned that "the difficulties of penetration into spinal fluid" heretofore experienced with arsenicals and other drugs, might be overcome.

Referring to the report of the University of Wisconsin investigators, a recent editorial†

*Lorenz, W. F., J. A. M. A., Vol. 80, No. 21, page 1497.
†J. A. M. A. June 2, 1923, page 1621.

says "Of forty-four patients who were in an advanced stage of general paresis, twenty-one had been discharged from the hospital and were earning a living. Of twelve other much agitated patients in an acute stage of the disease, seven recovered normal mentality and were earning a living. The remaining five mentally were in condition to work but had not been discharged on account of the serologic findings." The Wisconsin men summarized their article in the following significant language:

"Tryparsamid and mercuric salicylate given according to the method herein described is especially effective in early paresis and neurosyphilis. In our experience it is more effective than any other form of treatment used. We also recommend its trial in cases that are 'Wassermann fast' and in syphilitic patients showing a poor state of nutrition and those beyond middle age. Tryparsamid, when employed in dosage of 3 gm., produces no local or general symptoms, either immediate or late, and can be used to advantage in cases where the patient can not tolerate arsenicals."

As pointed out in the article referred to, paresis develops in approximately five per cent of syphilitics; although between thirty and forty per cent of all syphilitic patients show "positive spinal fluid findings some time in the course of the disease." The inference drawn from these observations is that, although a large number of syphilitics at some time become infected in the cerebral spinal system, only a small per cent of all syphilitics go to the maximum manifestation of the disease as seen in paresis.

To sum up: Tryparsamid is a new arsenical preparation developed in the Rockefeller Institute for Medical Research. Powers-Weightman-Rosengarten Company is manufacturing it for the Institute. It is not on sale for general use. The drug is under the control of the Institute during the period of investigation and is, apparently, receiving that careful, scientific consideration given to the development of insulin in diabetes.

Tryparsamid is a trypanocidal rather than a spirocheticidal drug, although it appears to exert some spirocheticidal powers. The drug produces apparently decided tonic effects in patients debilitated by the late manifestations of syphilis, in patients suffering from syphilis of the nervous system, and in paretics.

The Council on Pharmacy and Chemistry

of the American Medical Association has postponed the acceptance of tryparsamid for New and Nonofficial Remedies; confirmatory evidence is awaited of its therapeutic efficacy and of its innocuous properties. In the report of the Council on this subject in the *Journal of the American Medical Association*, Volume 80, No. 21, page 1521, besides the current observations, a reference list of the literature on this new arsenical is given.

The High Blood Pressure Issue of American Medicine.

The June edition of *American Medicine* giving the present day conception of a group of men in various fields of medicine and surgery on the subject of high blood pressure is a valuable collection of papers on this question. Such a presentation should be of interest to doctors everywhere.

It is important that the profession shall crystallize its ideas on this symptomatic phenomenon, high blood pressure. It is unquestionably of paramount importance that fundamental factors back of the symptom shall be understood and classified. The presentation of this subject in a group of unrelated papers may not give us an orderly treatise on the perplexing condition, but it serves to present the many sides of the problem and points of view from which it may be considered. Some of the titles are: "On High Blood Pressure." (Sir Clifford Allbutt); "Variation in Blood Pressure, Its Causation." (Sir W. Arbuthnot Lane); "The Relation of the Thyroid to High Blood Pressure." (George W. Crile); "Blood Pressure in Pregnancy." (John N. Upshur); "The Relationship of High Blood Pressure to Other Impairments." (Eugene Lyman Fisk); "Blood Pressure in Infancy and Childhood." (George Daw Scott); "Retinitis of Hypertension." (W. L. Benedict). This partial list shows that one may read this edition of *American Medicine* and obtain the best thoughts on this subject from some of the foremost men in medicine today.

News Notes

Plan Your Vacation to Include Attendance at State Society Meeting.

The Roanoke committee in charge of arrangements for the annual meeting of the Medical Society of Virginia, October 16, 17,

18 and 19, has sent out cards to all members, urging them to bear in mind attendance upon the State meeting in making plans for their vacations. Don't forget it. A large attendance adds to the interest of the meeting and you will miss a good time if you are not there.

The Program Committee has selected "The Pancreas" as the subject for the general symposium at our Roanoke meeting. This is to be discussed as follows:

Anatomy and Physiology of the Pancreas by Dr. Theodore Hough, University;

Pathology of the Pancreas by Dr. K. D. Graves, Roanoke;

Diagnosis and Medical Aspect of Diseases of the Pancreas by Dr. James H. Smith, Richmond;

Surgery of the Pancreas by Dr. Joseph T. Buxton, Newport News.

These are only a few of the subjects of interest to be discussed.

Dr. John Staige Davis, the president, will shortly announce names of his invited guests.

Make your plans to attend and bring the ladies in your families.

Penetrative Powers of Arsenicals.

The probable reason why the chances for the complete cure of a generalized syphilitic infection are poor, says the U. S. Public Health Service, is because the usual remedies (arsphenamine, neoarsphenamine, and silver arsphenamine) all lack the power necessary to enable them to penetrate the infected tissues in sufficient amounts to destroy the last remaining parasites. Other arsenicals, supharsphenamine, tryparsamid, and 3-amino-4-oxyphenol arsonic acid, have superior penetrative powers and their use as remedies is suggested.

The report was made by Carl Voegtlin, M. I. Smith, Helen Dyer, and I. W. Thompson, all of the U. S. Public Health Service, after prolonged experimentation, both chemical and bacteriological, on rabbits. While the authors admit that results so obtained cannot be transferred without reservation to the treatment of human syphilis, they nevertheless advance several reasons that cause them to believe that a clinical trial of the more penetrative preparations named is strongly indicated.

In conclusion they express as Ehrlich did, their belief that no matter what arsenical may be used better results will be obtained from single large doses a week apart than from smaller doses given at shorter intervals.

Dr. L. L. Williams Returns from Malaria Study Abroad.

Dr. L. L. Williams, Jr., of the malarial control bureau, of the Virginia State Board of Health, is home again, after attending the epidemic commission of the league of nations, as the representative of the United States in the study of malarial control work. This study began in Italy the latter part of May, with representatives from the countries in the league of nations. Dr. Williams, the only representative from the western hemisphere, represented the United States through the courtesy of the league, as the United States is not a member of that body. Although no methods of control are used in Italy which are not known in this country, Dr. Williams states that Italy's malarial problem is much greater than the one faced here, since that peninsula has malignant and fatal types not prevalent in the United States.

Leprosy Amenable to Treatment.

Leprosy is in a measure amenable to treatment, according to reports issued by the U. S. Public Health Service. During the last ten years (1912-21) a considerable percentage of the lepers segregated at the Kalihi Hospital near Honolulu and on Molokai Island have been paroled; that is, they have been released as being "not a menace to the public health," but have been required to report for examination at certain intervals which vary with the individual case. Of those paroled about 13 per cent have relapsed and have returned to segregation; but about one-fourth of these were later paroled for the second time. In all, 242 lepers were paroled: 31 relapsed and seven of these were later paroled. Ten were completely released from parole.

The chance of arresting the disease decreased with the length of time that it had been allowed to go without treatment, unless this period was seven years or more. Apparently patients who survive without treatment for seven years possess powers of resistance that slightly increase their chances for marked improvement under treatment.

Those who desire it are treated with chaulmoogra oil and its derivatives.

The parole system was begun in 1912 and has worked admirably. Those paroled appear to have told their friends that the conditions existing at the hospital were good; and the mere fact that they had been released has

shown that segregation might lead to cure and not to lifelong confinement, as it almost invariably did previous to 1912. As a consequence many lepers, instead of concealing the disease up to the last possible moment (and thereby spreading it through the community) are now surrendering of their own accord and taking treatment. This earlier surrender and earlier treatment hasten the degree of improvement that will secure parole and will later, perhaps, complete release. About 70 per cent of those who have been paroled were in segregation for less than two years.

Dr. O. O. Ashworth,

Who has been doing special work in tuberculosis at Catawba Sanatorium, Va., for the past year, became a member of the staff of the Medical Department of St. Elizabeth's Hospital, Richmond, July 1. Dr. Ashworth formerly served as interne at this hospital.

Dr. H. C. Beckett

And son of Chase City, Va., are visiting Bluefield and a number of other West Virginia cities. They expected to be away from home a month or more.

The American Gynecological Society,

At its annual meeting held at Hot Springs, Va., recently, elected the following officers for the ensuing year: President, Dr. Barton Cooke Hirst, Philadelphia; vice-presidents, Drs. John O. Polak, Brooklyn, N. Y., and Herbert M. Little, Montreal, Canada; secretary, Dr. Arthur H. Curtis, Chicago; treasurer, Dr. Charles C. Norris, Philadelphia.

Progress in X-Ray Therapy.

The extraordinary development of the X-ray as a therapeutic agent is unquestionably one of the most important outstanding achievements of the day. The recent perfection of new machines of immense power has expanded the field so considerably that it is impossible at this time to predict what the ultimate scope of this imponderable but powerful force will prove to be in the field of treatment; but it seems safe to say that it will finally mean as much here as it has meant for years in the field of diagnosis.

It is a source of satisfaction to the Virginia profession to realize that roentgenologists here will maintain in therapeutics the very high standard they have already established for themselves in diagnosis. Dr. Fred M.

Hodges of Richmond has just installed a 300,000 volt apparatus which has been in operation a few days. This is the first of the great new machines to appear in Richmond. It is understood that plans are now being projected by other X-ray men in Richmond and elsewhere in Virginia to make similar additions to their equipment. It is also gratifying to know that the benefits of the new apparatus will be available to all sufferers, whatever their financial resources. Dr. Hodges has just announced that he is arranging hours for a free clinic at his offices for those who are unable to pay.

The application of the X-ray in therapeutics is being guarded by careful painstaking work in which the leading roentgenologists of the country are in close co-operation. No claims are made for it until its efficiency has been tested many times, by many men, under many circumstances. It is nevertheless rapidly reaching out into new channels. Perhaps its greatest promise is in the dreary field of malignancy. Its value in surface malignancy has long been recognized; the new machines of great penetrating power apparently enable it to reach the deeper growths. In the treatment of toxic goitre, uterine fibroids, menorrhagias, certain skin affections, and various other conditions, very notable work has been done.

Married.

Dr. Hunter McGuire and Mrs. Jane Love Baker, both of Winchester, Va., in Asheville, N. C., June 12.

Dr. J. Edwin Wood, Jr., and Miss Emily Mildred Battle, both of Charlottesville, Va., June 28.

Dr. Lawrence Hiter Hoover and Miss Flossie Webster McFarland, both of Clarksville, Va., in Richmond, June 17. Dr. Hoover is a member of the class of '20, Medical College of Virginia.

Dr. Kemp P. B. Bonner, Raleigh, N. C., and Miss Clara Bell Martin, Beaufort, N. C., June 4.

Dr. Fred Wharton Rankin, Louisville, Ky., and Miss Edith Mayo, daughter of Dr. and Mrs. Charles H. Mayo, Rochester, Minn., June 12. Dr. Rankin was formerly of Mooresville, N. C., but has recently been appointed professor of surgery in the University of Louisville, Medical School.

Dr. and Mrs. Arthur Bryan Carr,

Of War, W. Va., have returned home after a visit to Mrs. Carr's family in Richmond. Dr. Carr is a graduate of the Medical College of Virginia in the class of '21.

The Association of Surgeons of The Southern Railway

Held a most interesting and pleasant meeting in Charleston in May, under the presidency of Dr. W. M. Cunningham, of Corona, Ala. The three prizes offered by the *International Journal of Surgery* each year for the three best papers were awarded respectively to Dr. Edward T. Newell, Chattanooga, Tenn., for his paper on "Traumatic Shock;" Dr. H. S. Black, Spartanburg, S. C., for his paper on "The Transfusion of Blood;" and Dr. W. H. Frampton, Charleston, S. C., for his paper on "Fractures of Joints."

The following officers were elected: President, Dr. Edward T. Newell, Chattanooga, Tenn.; vice-presidents, Drs. Edward F. Parker, Charleston, S. C., Dr. Crosson, Leesville, S. C.; Dr. Jeff Davis, Toccoa, Ga.; and Dr. T. F. Elkin, Tupelo, Miss.; historian, Dr. George Ross (re-elected), Richmond, Va.; recording secretary, Dr. W. S. Nash, Knoxville, Tenn.; executive secretary-treasurer, Miss Edith A. Foltz, Washington, D. C.

American Medical Association.

The meeting in San Francisco was a largely attended and most successful one. Dr. William A. Pusey is president-elect for the next meeting, which is to be held in Chicago in 1924. Only fifteen Virginia doctors registered attendance.

Dr. and Mrs. P. E. Tucker,

Buckingham, Va., have been on a visit of several weeks to West Virginia.

Dr. E. R. Ferguson

Announces that he has moved from Toms Creek to Inman, Va.

Dr. J. E. Wood, Jr., Instructor at University of Virginia.

At the June meeting of the Board of Visitors of the University of Virginia, Dr. J. Edwin Wood, Jr., B. S. 1918, M. D. 1921, University of Virginia, was elected instructor in Internal Medicine in the Medical Department of the University. Since his graduation in medicine, Dr. Wood has served as interne and house officer at Massachusetts

General Hospital, Boston, specializing in Internal Medicine. At University of Virginia, in addition to assisting in the instruction of the medical students, Dr. Wood will have special charge of electrocardiograph work of the University Hospital.

While at Massachusetts General Hospital, Dr. Wood published several papers giving the results of investigations in Internal Medicine.

Highsmith Hospital Installs New X-Ray Apparatus.

The Highsmith Hospital, Fayetteville, N. C., announces that it has added a Victor Deep Therapy X-Ray machine to its equipment. This gives the hospital a most complete X-ray laboratory for diagnosis and treatment.

Extension Work for Physicians of North Carolina.

What is termed as the largest single extension teaching project in the United States was launched by the Extension Division of the University of North Carolina, when during the week beginning June 18 over 350 physicians began a twelve weeks' postgraduate course which is being given in eighteen cities distributed throughout North Carolina. C. D. Snell, director of the University Extension division, stated that "While nearly all State universities now have extension divisions, this is the first attempt by any University to hold extension classes on such a large scale in every section of the State. The success of our work is entirely due to the splendid co-operation of our progressive North Carolina physicians at whose instance this work is being carried on."

Three courses will be given in Internal Medicine this summer on three circuits of six towns each, and beginning July 16 on another circuit composed of Winston-Salem, Greensboro, High Point, Salisbury, Concord, and Charlotte, a course will be given by Dr. B. T. Terry, of Vanderbilt Medical School, on the subject of General Pathology. The plan this summer calls for a lecture and a clinic a week in each of twenty-four cities which will be attended by groups of physicians numbering from fifteen to thirty.

What is called the Mountain circuit will have as instructor Dr. Frank A. Chapman, of Rush Medical College, Chicago. The places of the meetings on this circuit were Waynes-

ville, Asheville, Rutherfordton, Morganton, Hickory and Statesville.

Dr. F. Demette Adams, of Washington, D. C., instructor for the Sandhill circuit, had meetings at Raleigh, Sanford, Carthage, Hamlet, Lumberton, and Fayetteville.

Dr. Sidney Burwell, of Johns Hopkins, had charge of the Tidewater circuit, meetings on this circuit being held at New Bern, Washington, Williamston, Tarboro, Greenville, and Kinston.

This is the third summer of postgraduate medical extension courses as given under the auspices of the Extension Division and Medical School of the State University. They are growing in popularity each year, and already plans are being laid for a series of courses to be given during the summer of 1924.

Dr. Rhodric W. Browne,

Member of the Medical Society of Virginia and at one time stationed at Norfolk, Va., with the U. S. Public Health Service, has been transferred from U. S. Veterans' Hospital, No. 36, to U. S. Veterans' Bureau at Lake City, Fla.

Dr. M. A. Lackey,

Recently of Portsmouth, Va., is now at Mooresville, N. C.

Dr. Lawrence T. Royster,

Norfolk, Va., has been appointed by Governor Trinkle as a member of the State Board of Health, for a term of four years beginning July 1, 1923.

The National Tuberculosis Association,

In recent session at Santa Barbara, California, elected Dr. Livingston Farrand, president of Cornell University, Ithaca, N. Y., president. Memphis, Tenn., was selected as the 1924 convention city.

The Virginia Pharmaceutical Association,

At its meeting held at Virginia Beach, the latter part of June, elected S. C. Brooks of Purcellville president for the coming year.

The West Virginia State Medical Association

Held a most interesting and enjoyable meeting at Beckley, June 12, 13 and 14. Wheeling was selected as the 1924 place of meeting and the following officers were elected: President, Dr. Robert A. Ashworth, Moundsville; vice-

presidents, Drs. Charles S. Smith, Beckley, R. H. Dunn, South Charleston, and S. B. Lawson, Logan; secretary, Dr. D. A. MacGregor, Wheeling; treasurer, Dr. Hugh G. Nicholson, Charleston; editor of journal, Dr. J. R. Bloss (re-elected), Huntington; delegate to the A. M. A., Dr. H. P. Linsz, Wheeling; alternate, Dr. A. P. Butt, Elkins.

Councilors are: *First District*, Dr. Charles G. Morgan, Moundsville, elected; *Second District*, election deferred, Dr. J. C. Irons, Dartmoor, holds over; *Third District*, election deferred, Dr. C. R. Ogden, Clarksburg, holds over; *Fourth District*, Dr. G. D. Jeffers, Parkersburg, elected; *Fifth District*, Dr. Harry G. Steele, Bluefield, elected; *Sixth District*, Dr. C. A. Ray, Charleston, elected.

Among the Virginia doctors registered at this meeting were Drs. Manfred Call and Paul V. Anderson, Richmond; Hugh H. Trout, Roanoke, and E. E. Watson, Salem.

W. Va. State Alumni Association of Medical College of Virginia.

Prior to the meeting of the West Virginia State Medical Association in Beckley, the middle of June, a call was sent to the alumni of the Medical College of Virginia, the University College of Medicine, Richmond, and the Medical College of North Carolina, practicing in West Virginia, to attend an alumni meeting and luncheon to be held in Beckley during time of the State Society meeting. This meeting was quite a success, thirty-one of the alumni being present. The name of the Association was changed from the Alumni Association in Southern West Virginia to the above name. Dr. Manfred Call, of Richmond, made an address before the Association.

Officers for next year were elected as follows: President, Dr. John E. Cannaday, Charleston; vice-president, Dr. Robert A. Ashworth, Moundsville; secretary-treasurer, Dr. Walter E. Vest, Huntington. The next meeting is to be held in Wheeling at the 1924 meeting of the West Virginia State Medical Association.

Dr. R. J. Wilkinson,

Huntington, W. Va., has been spending a vacation with his brother at Bedford City, Va.

Dr. J. S. Horsley, Jr.,

Finished his internship at St. Elizabeth's Hospital, Richmond, the first of July, after

which he left for the Mayo Clinic, Rochester, Minn. He expects to do special work in surgical pathology, for several months.

Dr. W. J. Marquis,

Who has been an interne at St. Elizabeth's Hospital, Richmond, since July 1, 1922, also left the first of July for the Mayo Clinic. While there he will take up work in roentgenology as a Fellow.

Woman Physician for Coast Guard Duty.

Dr. Blanche N. Epler, residing at Hatteras, N. C., has been appointed by the U. S. Public Health Service as contract physician to furnish professional services to Coast Guard stations Nos. 181-185 inclusive.

Dr. Epler is engaged in private practice among the inhabitants of this somewhat isolated and exposed region. She will be prepared to respond at any time, day or night, to calls arising out of any serious accidents happening to Coast Guardsmen in the course of their arduous tasks, and will also conduct the visual and other physical examinations of applicants for admission to the Coast Guard service at the stations under her medical supervision. Dr. Epler was chosen for the work after she had proved that she was fitted to meet the requirements of the post and had been recommended for the duty by the local District Superintendent of the Coast Guard.

Corner-Stone of Hospital Laid.

July 3 was a gala day for the Eastern Shore of Virginia, when the corner-stone was laid at Nassawadox, for the \$150,000 Accomac-Northampton Memorial Hospital to be located at that place. There were speeches and a ball game, and dinner and supper were served on the hospital grounds at a nominal price. Work is progressing well on the hospital and it is expected that it will be completed by the first of the coming year. It is of brick and stone, fireproof, modern and up-to-date in every respect, and will be a credit to those who have promoted its construction.

Dr. and Mrs. A. W. Rusmiselle,

Waterford, Va., are home again after a visit to friends in Strasburg, Va.

Dr. William H. Parker,

Richmond, returned home the latter part of June, after a visit to Rochester, N. Y.

Dr. W. C. Moomaw

Has been elected one of the directors of the Petersburg (Va.) Y. M. C. A., for a period of three years.

Dr. Weymouth's Home Struck By Lightning.

Lightning struck the home of Dr. S. E. Weymouth, Callao, Va., the latter part of June, and did considerable damage.

Dr. Carrington Williams

Has been elected first vice-president of the newly formed Civitan Club of Richmond, Va.

Dr. William F. Drewry,

Petersburg, Va., in June attended the annual meeting of the American Psychiatric Society in Detroit. Dr. Drewry is an ex-president of this Society.

American Medical Aid for Russia.

Again an appeal comes from the American Medical Aid for Russia, 103 Park Avenue, New York City, for money, clothing, instruments, books and journals for the medical men in Russia. It is stated that they not only lack the barest necessities of food and clothing, but are terribly in need of drugs, medical and surgical instruments, and of scientific books and journals in English. Contributions will be promptly and efficiently distributed in Russia. Send the things you can not and do not use yourself, to the New York office for distribution to points where most needed.

Dr. R. L. Raiford,

Of Sedley, Va., spent a part of June visiting Dr. Henry A. Cotton, of Trenton, N. J., and the clinics of several of the larger Northern cities, making a special study of focal infections and allied diseases.

Dr. and Mrs. J. C. Coulter

And daughter, of Charlottesville, Va., returned home the middle of June, after their annual visit to Dr. Coulter's parents near Pittsburgh, Pa. They visited a number of places of interest in West Virginia and Pennsylvania, while away.

Dr. Charles A. Easley

Is now well and has resumed his practice in Bluefield, W. Va., after having been away for several months on account of his health.

Dr. Edward B. Broocks,

Of the class of '16, Medical Department of the University of Virginia, is visiting at his former home in Chase City, Va. Dr. Broocks has, for the past two years, been connected with the pediatric work of a hospital in Toronto, Canada.

Dr. Allen W. Freeman,

Formerly of Richmond, but now professor of Hygiene and Public Health in the Johns Hopkins School of Hygiene and Public Health, delivered an address on "Health Administration in Rural Districts" before the annual conference of sanitary officers and public health nurses of New York State, the latter part of June. In this address he urged the importance of appointing full time health officers on a county basis.

Dr. and Mrs. James K. Corss,

Newport News, Va., who started last January for a trip around the world *via* Panama and San Francisco, left Paris the latter part of June and were expected home early in July.

Dr. and Mrs. J. Shelton Horsley

Returned to their home in Richmond the first week in July, after attending the meeting of the American Medical Association held in San Francisco. Dr. Horsley was chairman of the Scientific Assembly of the Association and read a paper before the Section on Obstetrics, Gynecology, and Abdominal Surgery.

On their way west, they spent several days in El Paso, Texas, where Dr. Horsley practiced for five years, having operated the first private hospital in that city. They also stopped for a few days at Albuquerque, New Mexico, where Dr. Horsley read a paper before the New Mexico State Medical Society.

Dr. Banting listed for Annuity.

It is announced that Dr. Frederick G. Banting, discoverer of the insulin treatment of diabetes, has been listed for an annuity of \$7,500 in the Canadian parliament, that he may devote the rest of his life to medical research. If parliament approves the budget, as it is expected to do, Dr. Banting, yet a young man (only 30 years of age), will be free from the struggle for existence to devote his life to research work.

This is a fitting tribute paid by the Canad-

ian government for the great benefit Dr. Banting is rendering humanity.

Dr. R. W. Selby

Has returned to his home at Middleburg, Va., after a visit to his former home in Northumberland County, Va.

Dr. Charles W. Pritchett

Has been elected president of the Lions Club of Danville, Va.

Results of Nutrition Classes Organized in Richmond.

Fine gains in weight have been made by the boys and girls in the nutrition classes organized in Richmond, this spring, by Dr. William R. P. Emerson, of Boston, noted authority on malnutrition among children. In one class, three children are reported to have gained eleven pounds each in eight weeks. Another class shows an average gain of 20 ounces a week per child, which is ten times the normal gain for children of the age in this class.

Dr. Emerson, in his talks demonstrated the necessity for the removal of physical defects, that the child may be fit to gain. Other causes of malnutrition given by Dr. Emerson were lack of home control, over fatigue, faulty food habits, faulty health habits, and insufficient food.

A movement has been launched throughout the State to further nutrition work in the rural schools by providing scales for weighing pupils, to ascertain if their weight is correct for their height.

Dr. and Mrs. A. B. Householder

Recently returned to their home in Lovettsville, Va., after a visit to Washington, D. C.

Dr. C. D. Kunkel,

Pulaski, Va., in June visited a daughter living in Lynchburg, Va.

Cancer Workers Meet in San Francisco.

In response to a call issued to state and provincial chairmen and regional directors, by the American Society for the Control of Cancer, a number of "cancer workers" met during the A. M. A. meeting in San Francisco, and heard accounts of the work being done throughout the country and had presented them an explanation of the District Cancer Campaigns to begin next Fall, together with a full discussion of organization plans

and the activities proposed to be carried out. The meeting was considered fully "worth while" by those who were fortunate enough to be able to attend.

Doctors in Political Offices in Loudoun County.

At the elections held in Loudoun County, Va., in June, the following doctors were elected: Drs. J. B. Hackley and G. F. Simpson, as members of the council of Purcellville; Dr. H. A. Spitler as member of council of Middleburg; and Dr. L. T. Rusmissele as a member of the council of Waterford.

Dr. Julius H. Taylor,

Columbia, S. C., a member of the class of '01. of the Medical Department of the University of Virginia, has been appointed a member of the State Board of Medical Examiners of South Carolina.

Dr. Archer A. Wilson,

Of News Ferry, Va., a graduate of the class of '23. Medical College of Virginia, has located at Oxford, N. C.

Dr. George C. Payne

Has entered upon his duties as epidemiologist with the State Board of Health. Prior to this, he visited a number of Northern cities, studying modern methods used in the investigation and prevention of epidemics. Dr. Payne has just taken his degree as doctor of public health from the Johns Hopkins School of Hygiene and Public Health and has previously had several years' experience as a practicing physician.

Dr. B. C. Crowell Professor of Pathology at Jefferson Medical College.

Announcement has been made of the election of Dr. Bowman C. Crowell, lately professor of pathology in the Medical College of the State of South Carolina, at Charleston, as professor of pathology in Jefferson Medical College, Philadelphia. He succeeds to the position formerly occupied by Dr. Wm. M. L. Coplin, who resigned one year ago. Professor Crowell is a native of Nova Scotia and a graduate of McGill University, Montreal. His experiences as teacher, pathologist and investigator have been varied and interesting and Jefferson College is to be congratulated upon having secured his services.

Dr. Daniel S. Lamb Honored.

In commemoration of his fifty years of ser-

vice in Howard University School of Medicine, Washington, special exercises were held for Dr. Daniel S. Lamb, June 7 and 8. At this time, the honorary degree of Doctor of Science was conferred upon him. Dr. Lamb is now professor of anatomy at the University.

Dr. James A. Hayne,

Columbia, State Health Officer of South Carolina, delivered the address before the graduating class of the Richmond School of Social Work and Public Health, held in this city last month. Dr. Hayne is an attractive speaker and has many friends in this State, having attended the academic department of the University of Virginia, prior to studying medicine at the Medical College of the State of South Carolina.

Dr. George W. Crile,

Cleveland, was elected president of the American Surgical Association, at its annual meeting recently held in Rochester, Minn.

Dr. D. Hunter Marrow,

Daytona, Fla., is spending the summer at his old home, Union Level, Va.

Dr. James F. Terrell,

Of the class of 1918, Medical College of Virginia, is now a lieutenant in the Medical Corps of the U. S. Navy and stationed at Submarine Base, Coco Solo, Canal Zone.

Dr. Howard Urbach,

Richmond, was elected State physician of the Maccabees at their convention held in Alexandria, the latter part of June.

Dr. B. P. Seward,

After a year's service as interne at Stuart Circle Hospital, Richmond, has located at Surry, Va., where he will continue the practice of his profession.

Dr. S. C. Draper,

After a short time at Inman, Va., will resume practicing at his former home, Pulaski, Va.

Appointments on State Board of Health.

Dr. Isaac Peirce, Tazewell, Va., has been reappointed by Governor Trinkle, a member of the State Board of Health from the Ninth Congressional District, and Dr. A. L. Tynes, Staunton, has been appointed a member from the Tenth District. Both appointments are for a term of four years, beginning July 1, 1923.

Dr. and Mrs. J. W. Hannabass,

Of Richmond, recently had a very pleasant trip visiting Northern cities.

Dr. H. S. Daniel,

Louisa, Va., left early in June for Baltimore, where he expected to take a special course at Johns Hopkins University. While he is there, Mrs. Daniel is visiting her old home in Pennsylvania.

Dr. George C. Snead,

Trammel, Va., was a recent visitor at his former home in Lynchburg, Va.

Dr. F. W. Lewis,

Morattico, Va., went to Baltimore, recently, for hospital treatment.

Dr. Clarence Porter Jones

And son, of Newport News, Va., have been spending a couple of weeks fishing at Nimrod Hall, in Bath County, Va.

Wanted:

Physician for hospital work in small town in Virginia. Must be capable of doing X-ray and laboratory work. Reply, stating salary wanted and references, to No. 217, care this journal. (Adv.)

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Obituary

Dr. William Elbert Killinger,

A prominent young physician of Victoria, Va., connected with Kendig Brothers' Hospital, was accidentally drowned while in bathing near his home on June 17. Accompanied by his wife and a friend, Dr. Killinger went to the pond and, leaving them on shore, rowed to the middle of the pond and dived off the boat. On rising to the surface, he called for

help but was drowned before any one could go to his rescue. Dr. Killinger was born at Rural Retreat, Va., twenty-nine years ago. After several years at Yale, he took up the study of medicine at Tulane University of Louisiana, from which he graduated in 1921. After an internship at Sarah Leigh Hospital, Norfolk, he became a member of the Kendig Brothers' Hospital staff, with which he was connected at the time of his death. He was a member of the Medical Society of Virginia. Dr. Killinger married about a year ago and is survived by his wife, parents and several brothers and sisters.

Dr. Richard Curd Bowles,

Of near Kents Store, Va., died June 7, at the age of 86 years. Dr. Bowles was widely known throughout the State and was an honorary member of the Medical Society of Virginia. He graduated in medicine from the University of Maryland in 1861 and immediately entered the Confederate service in the War between the States. Later he was made an assistant surgeon in the Confederate States' navy. After the war, he returned to his native county, where he practiced his profession for a long number of years. He is survived by his wife and several children.

Dr. Robert R. Jones,

A highly esteemed and beloved physician of Brunswick County, Va., died at his home at Diamond Grove, June 7, from old age. Dr. Jones was eighty-eight years of age. He studied medicine at Jefferson Medical College, Philadelphia, graduating in the class of 1855. He had practiced his profession in the county of his birth for sixty-eight years, with the exception of a short time, while acting as druggist at Camp Lee, near Richmond, during the Civil War. He retired only a few years ago. Dr. Jones is survived by three sons, one of them Dr. R. R. Jones, Jr., of Lawrenceville.

Dr. Lawson Betts Moore

Died July 3 at his home in Charlottesville, after a lingering illness. Dr. Moore was born in Berryville, Va., 61 years ago and, upon completing his academic education, entered the University of Virginia, where he commenced the study of medicine, later receiving his diploma from the University of Maryland in 1887. Dr. Moore was a member of the Medical Society of Virginia. For some years he resided in southwest Virginia.

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OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Fifty-fourth Annual Meeting, Roanoke, October 16-19, 1923.

Vol 50, No. 5.
WHOLE No. 854.

RICHMOND, VA., AUGUST, 1923

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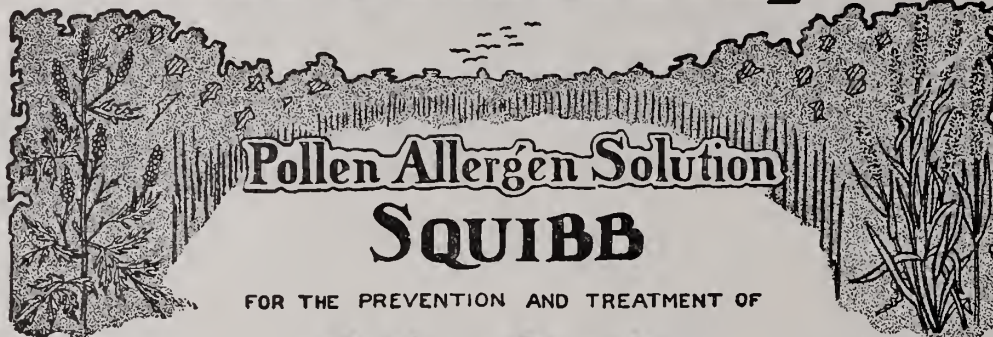
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Original Communications

THE TREATMENT OF LOBAR PNEUMONIA.

By RUSSELL L. CECIL, M. D., New York City.

In the treatment of lobar pneumonia we are governed by the same general principles that apply to the treatment of all serious infections. These principles have to do with rest, ventilation, proper diet, catharsis, and the control of various symptoms as they arise.

Rest is particularly important in the treatment of pneumonia. Too much physical examination, having the patient sit up in bed, and other such procedures are not only bad for the heart, which is already under strain, but may be responsible for the spread of the disease into other lobes. Since death in pneumonia is generally due to extension of the disease, everything should be done to limit the infection to the original lobe, and complete rest and quiet are important factors in achieving such a result. It is very important for the patient to get plenty of sleep, and the physician should not hesitate to employ codeine or morphine for this purpose.

Proper ventilation is very important for the pneumonia patient. Anoxemia is a common symptom in pneumonia and can be combated in part by a generous supply of fresh air. There is still difference of opinion as to whether pneumonia patients should be put out on balconies when the temperature is freezing. Perhaps it is better not to be dogmatic on this subject, but to use the fresh air treatment when the patient wishes it and when he feels better out doors. It is generally agreed that cold air is injurious in broncho-pneumonia, particularly the type following measles.

The diet in pneumonia should be liquid, but the choice of articles may be left in large part to the taste of the patient. A limit, of course, must be put on carbohydrates, as an excess of sugar would tend to produce tympanites. For the same reason, I am opposed to a high calory diet in pneumonia. Pneumonia runs a

short course, and a high calory diet is entirely unnecessary. It is most important that patients with pneumonia should drink large amounts of water, particularly if they have a high temperature, or appear toxic.

The bowels are best regulated by salts and daily enemas. In many cases enemas alone are not sufficient to prevent distention and even with the addition of Epsom salts by mouth the distention may become so great that turpentine stupes are necessary. Magnesium sulphate is probably the best of the various mineral salts and should be given in fairly large doses.

Pain in the side is best controlled by codeine administered every two or three hours, either by mouth or subcutaneously. In cases where the pain is very severe, morphine should be used without hesitation, not only to relieve the pain, but to give the patient rest and sleep. The drug treatment may be supplemented by hot poultices and by strapping with adhesive plaster if necessary. The last procedure interferes somewhat with the examination of the patient and should be avoided if possible.

Cough is often a very distressing symptom in pneumonia, and here again we must depend on codeine and morphine not only to control the cough but to give the patient opportunity for sleep. When the sputum is extremely viscid, ammonium chloride may be administered with advantage.

Stimulation in some form or other is usually desirable in the course of pneumonia and the most popular cardiac stimulant at the present time is digitalis. A good tincture is usually easiest to obtain and should be given in fairly large doses at the outset. (1 dram, b. d.). On the second day the dosage may be cut to 20 mms. t. i. d. In cases of emergency, ouabin, one-half mg., may be administered intramuscularly. As much as two and one-half mg. may be administered within twenty-four hours. This is a very powerful stimulant, but in most cases where cardiac failure has set

in we have found that the benefit derived from cardiac stimulation is only temporary at best. Alcohol is still used by some good clinicians, but the trend of opinion seems to be against its use in pneumonia. Camphor, strychnin and caffeine may also be employed, but probably have very little therapeutic value.

SERUM TREATMENT. I believe that Type I anti-pneumococcus serum is of benefit in pneumococcus Type I pneumonia, when administered early in the disease and in large doses. This form of treatment, however, has not proved to be altogether practical for the general practitioner. The chief reason for this is the difficulty and delay connected with the proper typing of sputa. The statistics reported from the Rockefeller Institute by Cole and his co-oworkers showed a death rate of only 7.5% in cases of Type I pneumonia which had been treated with serum, whereas the control cases ran a death rate of 25%. Recent reports from other hospitals, however, do not show such a striking difference. In the first place, the death rate for untreated Type I pneumonia appears to lie between 20 and 25%, depending on the season, etc. Dr. Edwin A. Locke, of Boston, recently collected a large series of Type I cases which had been treated with Type I anti-pneumococcus serum in various hospitals where the records were accurate and the treatment had been faithfully carried out. In Dr. Locke's series there was practically no difference in the death rate between treated and untreated cases, except in a comparatively small group which had received serum treatment early in the disease. In the cases treated early the death rate was only about 9%.

During the last two years we have been working with a modified anti-pneumococcus serum at Bellevue Hospital. This preparation was first worked out by F. M. Huntoon, and is nothing more than a water solution of the immune bodies originally contained in polyvalent anti-pneumococcus serum. By a very ingenious procedure, Huntoon was able to extract the immune bodies from the anti-pneumococcus serum and redissolve them in water. This product is known as pneumococcus antibody solution and contains protective substances against pneumococcus Types I, II, and III.

The advantages of this preparation are:

1. It is polyvalent; that is, it is aimed against the three fixed types of pneumococcus, and according to our figures it has shown itself to be of distinct value in the treatment of Type IV pneumonia. By reason of its polyvalent character, typing of the sputum is no longer absolutely necessary, and treatment of the patient can be instituted as soon as the diagnosis of lobar pneumonia has been made. This, of course, is a great advantage over serum.

2. Pneumococcus antibody solution is practically free from horse proteins, hence there is no danger of anaphylaxis or serum sickness. This removes a great source of worry for the physician and discomfort to the patient, and there is, therefore, no reasonable limit to the amount of antibody solution that can be administered.

3. Pneumococcus antibody solution contains a certain amount of pneumococcus protein which may conceivably act in the capacity of a vaccine.

4. The fact that the preparation is a water solution renders it very soluble and easy to absorb and possibly presents the immune substance to the body in a form more acceptable than that of serum.

The antibody has usually been administered intravenously in doses of 50 to 100 cc., the technique being similar to that of serum administration. Injections are given once or twice, sometimes three times a day. The reaction produced by antibody is very characteristic and striking. In 20 to 40 minutes after the injection the patient usually begins to shiver and is soon in the midst of a hard chill, which lasts from 15 to 20 minutes. At its conclusion the patient complains of fever and the temperature may have risen to 106° F., or even to 108 or 109. This high temperature usually persists for only a short time, 30 to 60 minutes. The rapid fall is accomplished by a profuse perspiration, which may continue for several hours. The fall in temperature may be slight, but is often extensive, amounting to 8 or 10 degrees. It may be temporary or permanent, depending on the stage of the disease. These reactions are very similar to the so-called "foreign protein" reaction, and are probably due to a disturbance in the colloid equilibrium of the blood. The dose of antibody administered does not bear any close relation to the character or severity of the re-

action. In one patient 10 cc. may produce a severe chill, while another patient may tolerate 100 cc. without any reaction whatever. The reactions are more severe when treatment is started late in the disease.

During the past two and a half years this solution has been tested on a large scale in the wards of Bellevue Hospital. Through the kind co-operation of the various directors all cases of lobar pneumonia admitted to the twelve medical wards were studied bacteriologically, and on six of the twelve wards practically every case of lobar pneumonia was treated with intravenous injections of pneumococcus antibody solution. The other six wards were used as control wards. In these wards patients with pneumonia received no antibody but in other respects were treated in practically the same way as the patients who received antibody. Specific treatment was started as soon as the diagnosis of pneumonia was made. The result of the experiment are shown in Table I.

TABLE I.
COMPARISON OF DEATH RATE IN TREATED AND CONTROL SERIES.

Type	CASES TREATED WITH ANTIBODY			CONTROL CASES		
	Cases	Deaths	Rate%	Cases	Deaths	Rate%
Pneumococcus I	157	21	13.4	175	41	23.4
Pneumococcus II	78	22	28.2	76	31	40.7
Pneumococcus III	57	20	35.	60	24	40.
Pneumococcus IV	109	17	15.6	137	31	22.8
Total	401	80	19.9	448	127	28.3
Strep. Hemolyt.	21	10	47.6	21	9	42.8
Strep. Viridans	7	1	14.2	10	1	10.

It will be observed that 401 cases of pneumococcus pneumonia were treated in the antibody wards, and 448 in the control wards. There was considerable difference in the mortality rate for Type I cases, 13.4 per cent. for the 157 treated cases, as compared with 23.4 per cent. for the 175 untreated cases. In the Type II groups the treated cases showed a death rate of only 28.2 per cent., as compared with the control death rate of 40.7 per cent. In the Type III series, the percentage of fatalities was more nearly the same for the two groups, 35 per cent. for the treated; 40 per cent. for the untreated cases. Strangely enough, a considerable difference in mortality rate was noted in favor of the treated Type IV group, 15.6 per cent. against 22.8 per cent. Altogether, the treated pneumococcus cases showed a death rate of 19.9 per cent., while the control pneumococcus series represented a rate of 28.3 per cent. Streptococcus pneumonia was not bene-

fited in the least by antibody treatment. In fact, the death rate was higher for the treated series (39.3 per cent.) than it was for the untreated series (32.2). The number of cases, however, in the streptococcus group is too small to permit of accurate conclusions.

TABLE II.
DEATH RATES FOR PNEUMOCOCCUS PNEUMONIAS RECEIVING ANTIBODY ON OR BEFORE THIRD DAY OF DISEASE. CONTROL SHOWS DEATH RATE FOR PNEUMOCOCCUS PNEUMONIAS ADMITTED TO CONTROL WARDS ON OR BEFORE THIRD DAY OF DISEASE

Type	CASES TREATED WITH ANTIBODY			CONTROL CASES		
	Cases	Deaths	Rate%	Cases	Deaths	Rate%
Pneumococcus I	56	5	8.9	68	16	23.5
Pneumococcus II	24	5	20.8	25	8	32.
Pneumococcus III	10	1	10.	19	7	36.8
Total	90	11	12.2	112	31	27.6
Pneumococcus IV	24	4	16.6	45	11	24.4
Total	114	15	13.1	157	42	26.7

The results of treatment with antibody were much more striking in cases that were treated early in the disease. For example, in Table II it will be noticed that the death rate for Type

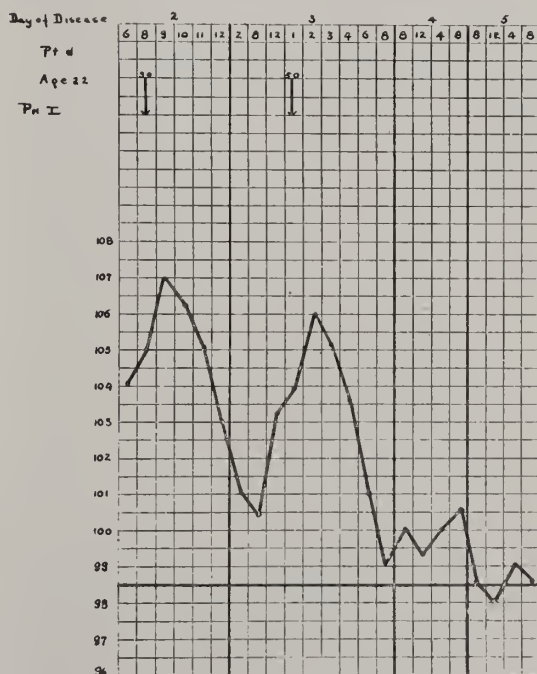


Fig. 1. Temperature Chart of Pneumococcus Type I Pneumonia.

I pneumonias treated during the first 48 hours of the disease was only 8.9 per cent., while controls admitted to the hospital during the first 48 hours of the disease showed a death rate of 23 per cent. Similar reductions are

noticed in the other types. Altogether, 114 pneumococcus pneumonias treated with antibody during the first 48 hours of the disease showed a death rate of only 13.1 per cent.; whereas 157 pneumococcus pneumonias in the control series ran a death rate of 26.7 per cent., more than twice as high.

Figure 1 shows the temperature chart of a Type I pneumonia treated with antibody. The case was that of a young man, aged 22, who came in with a consolidation of the right lower lobe. Antibody was given on the second day of the disease, 50 cc. intravenously. Following the injection, there was a rise of 3 degrees in the patient's temperature, followed by a characteristic fall. On the following morning the temperature rose to 104°, and another injection of antibody was given. This injection was also followed by a reaction with a fall of temperature to normal, where it remained. Figure 2 shows a Type II pneumonia treated with antibody solution, with reactions and results similar to those in the Type I case. Figure 3 shows a Type III case; Figure 4 a Type IV infection treated with antibody solution.

stance against Type IV pneumococcus. Evidence is accumulating, however, to show that pneumococcus Type IV is made up of atypical fixed types; in other words the Type IV strains represent aberrant forms of Types I, II or III. If this hypothesis is correct, it would readily explain the beneficial effect of antibody on Type IV pneumonia.

Upon the evidence which has been presented we must conclude that pneumococcus antibody solution is a therapeutic agent of considerable power. The effect is most striking when the antibody is administered early in the disease, but it may also be of value in the later stages by neutralizing the circulating toxins. The most dramatic effects are observed in Type I infections, but good results can also be obtained in the other types when antibody is used early and in large doses.

More recently we have been studying the effect of antibody when administered subcutaneously. By this procedure, one avoids entirely the severe reactions which are often very uncomfortable and, in certain cases, actually dangerous to the patient. It has been claimed,

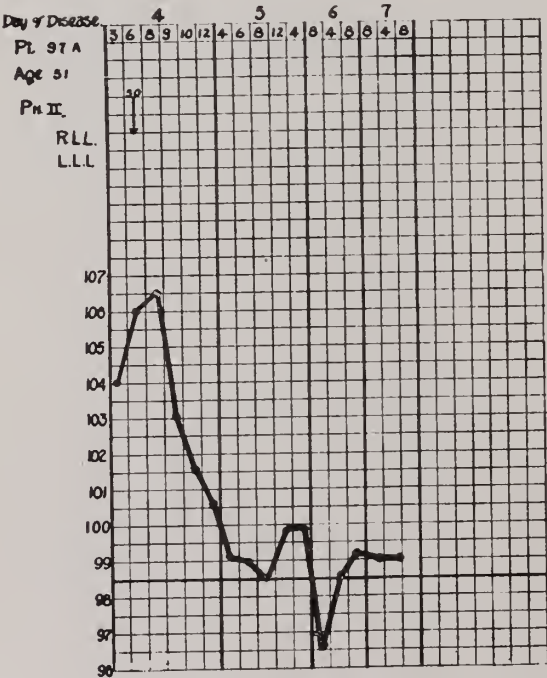


Fig. 2. Temperature Chart of Pneumococcus Type II pneumonia.

It is difficult to explain why Type IV pneumonia should be favorably influenced by pneumococcus antibody solution, as this agent is not supposed to contain any immune sub-

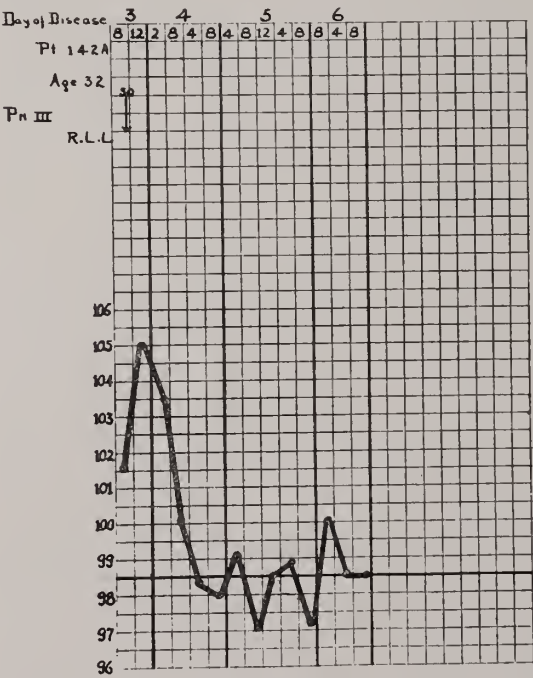


Fig. 3. Temperature Chart of Pneumococcus Type III pneumonia.

of course, that foreign proteins have therapeutic value in pneumonia and other infectious diseases. There is little evidence in our studies to support such a theory in respect to pneu-

monia. In the streptococcus pneumonias treated with antibody the death rate was higher in the treated cases than in the untreated cases. The proper time to administer the specific agent in pneumonia is during the first twenty-four hours of the disease. When antibody is given within twenty-four hours

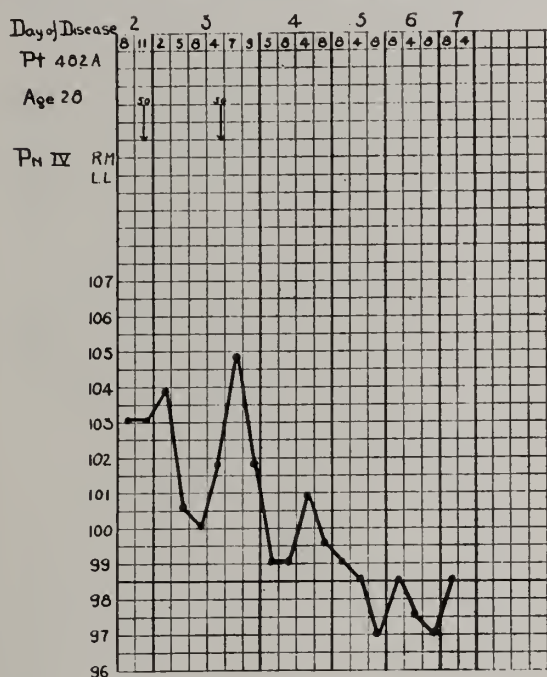


Fig. 4. Temperature Chart of Pneumococcus Type IV pneumonia.

after the chill, an aborted form of the disease is often produced, with the temperature going down to normal on the third or fourth day.

Contraindications to the intravenous injection of antibody are:

1. Cases complicated by severe systemic disease—cardiac, renal or vascular.
2. Cases seen late in the disease, when the patient's strength is well-nigh exhausted by the infection.
3. Pneumonia in the aged.

There is, of course, no contraindication to the subcutaneous administration of antibody, as it produces no constitutional reaction. The advantages of antibody, as already mentioned, are:

1. Its polyvalency, which makes it amenable for the treatment of all types and eliminates the necessity of typing the sputum.
2. Its freedom from horse protein and the danger of anaphylaxis and serum sickness.
3. The fact that it is water-soluble and readily absorbed when injected subcutaneously.

This preparation is still a new remedy and will certainly be subjected to further improvements as time goes on. A method must be devised for still further concentrating the antibody, and it would also be desirable to eliminate the shock reaction which follows the intravenous injection. Even in its present form, however, pneumococcus antibody solution marks an important step in advance in the specific treatment of pneumonia, and I believe that it will be along this line that an efficient mode of treating this disease will ultimately be worked out.

33 East Sixty-first Street.

SOME SOURCES OF ERROR IN THE INTERPRETATION OF THE PHTHALEIN TEST, WITH SPECIAL REFERENCE TO THE EFFECT OF EXERCISE.*

By WILLIAM H. HIGGINS, M. D., Richmond, Va.

Sufficient time has elapsed since the introduction of the phenolsulphonaphthalein test by Rowntree and Geraghty to classify it among our most reliable diagnostic methods. Its absorption and excretion have been so thoroughly studied and verified by numerous observers that it is now universally accepted as the most accurate and practical of all the functional kidney tests so far proposed.

However, in spite of its unsurpassed value in renal diagnosis, startling discrepancies occur with sufficient frequency to warrant an inquiry into the factors concerned in the mechanism of the test. These factors may arise in part through carelessness in technique. In many instances the administration of the dye is left to a nurse or technician and there may be some doubt as to the exact amount given or whether the injection was made intramuscularly or subcutaneously. Any laboratory method which is as free from complicating steps as the one under discussion is likely to suffer because of its simplicity from apparently unimportant but in reality damaging alterations in its application. In the light of knowledge brought out subsequent to the introduction of this test, we must also consider the more deeply hidden agencies involved in tissue chemistry in their relation to absorption and excretion.

In the earlier studies by Rowntree and Geraghty, and more recently by Braasch and

*Read before the Richmond Academy of Medicine and Surgery, Richmond, Va., November 30, 1922.

Kendall, the influence of various conditions on the elimination of the dye were pointed out. Although these observations are more or less familiar, their practical bearing on the amount of phthalein excreted in a given period may bear repetition at this time. These factors are of particular importance where the clinician finds variations in the functional output of the kidneys in successive readings and is in doubt as to their significance.

THE INFLUENCE OF THE ROLE OF ABSORPTION ON THE RATE OF EXCRETION.

Meltzer and Auer¹ were the first to demonstrate that absorption from the intramuscular tissue is much more rapid than that from the subcutaneous tissues. According to these investigators, rapidity of absorption from intramuscular injection is dependent not on the puncture of small veins in the muscles as held by others, but is due to the direct absorption through the walls of the blood vessels.

Following this work, Rowntree and Gerahty² showed by carefully controlled animal experiments and verified clinically that absorption for one hour from the subcutaneous tissues averages 5 to 10 per cent less than from the intramuscular, while at the same time considerable variation (37 to 62 per cent) existed in the absorption from the same dog. On account of these large variations, due apparently to tardiness of absorption, this method was subsequently discontinued. They accordingly investigated the intramuscular method (gluteal and lumbar) and found an average of 51 per cent elimination during the first hour by the gluteal route as compared with 57.5 per cent when the injection was made in the lumbar region. Intravenously the output of dye for the first hour averaged 67.9 per cent., considerably higher than that from other methods of administration. By studying the curve of excretion for 5 and 10 minute intervals it was found that from 30 to 35 per cent is excreted in the first 10 minutes after appearance, this being half the total excretion for one hour. The striking rapidity of elimination in the first few minutes following intravenous injection results, of course, from the concentration of the drug in the circulation. Their conclusion was that the intravenous method is not as accurate as the intramuscular, especially where ureter collectors are employed. The normal variations in the functioning power for

such short periods as 15 minutes or one-half hour are too great for accurate readings. In view of these studies they considered the intramuscular injection in the lumbar region the most desirable mode of administration.

Emphasis has been made on this point in technique as failure to take cognizance of these observations unquestionably introduces a source of error in the results.

The influences controlling the absorption from the site of injection are not entirely clear. It has been observed at the Mayo Clinic that in patients with urinary obstruction of long standing who were being prepared for operation the phthalein return by intramuscular injection was frequently lower than other clinical data would indicate. When the dye was given intravenously, the output was often nearly normal. This was particularly marked in patients undergoing preliminary treatment for prostatectomy, who were suffering from the reaction following drainage.

FACTORS INFLUENCING ABSORPTION AND EXCRETION.

More recently a clinical investigation of the phthalein test has been made by Braasch and Kendall³ at the Mayo Clinic. They make the inquiry whether in all cases of low phthalein output, the kidney is the only factor involved. If conditions should exist in the body whereby the injected phenolsulphonaphthalein is absorbed and retained in transit to the kidney, this action might result in delaying or indefinitely holding up a certain amount of the dye, so that the problem is not only one of whether the kidney can or can not excrete it, but whether or not the kidney has a chance to excrete it. Acting upon these premises, they showed first that the type of food and the capacity of each animal to carry out the reactions occurring in the metabolism of sugar and amino acids are among the factors determining the output of phenolsulphonaphthalein. They pointed out also that although the body as a whole eliminates the dye to a high degree, tissues other than the kidney have some upper and lower limits of saturation which must be satisfied before the kidney even begins to excrete it.

It is known, of course, that a small part of the phthalein is eliminated through the bile ducts, but to what extent and under what conditions the liver may act as a storehouse for

the dye is not clear. Besides the question of the mere retention of phenolsulphonephthalein in the body, it can be shown experimentally that it is actually destroyed in the body tissues in the absence of oxygen. This destruction within the tissues not properly oxygenated is rapid and complete. Braasch and Kendall undertook to determine to what extent the destruction may take place clinically. Their results indicated that only in very marked cyanosis is the dye destroyed and, if the patient is able to be up, it is doubtful whether destruction of the dye within the tissues plays a very important part in the lowered output.

In investigating the possibility of the retention of the dye in tissues other than kidneys, it was shown by Kendall that if the tissues of dogs are rendered alkaline, phenolsulphonephthalein will be more readily given up. Clinically, it was found that after alkalinization of the urine, the phthalein output was increased from 10 to 50 per cent, largely in patients suffering from urinary obstruction or renal infection; in other words, when the impairment in renal function was temporary and dependent on these factors. If, however, the impairment was permanent, as in advanced chronic nephritis, little difference was found in the output following the administration of an alkali.

The condition of the circulation of the blood may also influence the excretion of the dye. In cardiac insufficiency, the functional output may be greatly reduced although the kidneys may show only minor changes. This low output may be explained by delayed absorption as the phthalein return intravenously is much higher than when given intramuscularly. The effect of diuretics may be mentioned briefly. Rowntree and Geraghty carried out extensive experiments with various kinds and their conclusions were that only those drugs which exert their effect on the renal secreting cells increase slightly the phthalein output.

EFFECT OF EXERCISE ON THE PHTHALEIN OUTPUT.

After giving the usual instructions to patients upon whom the phthalein test is being carried out, the question is frequently asked, to what extent is exercise permissible? I took occasion about one year ago to search rather carefully through the voluminous literature for any reference to this point, but without avail.

In a personal communication from Dr. Geraghty, he stated that so far as he knew no effort had been made to determine the effect of exercise on the excretion of the dye.

The difficulties of determining this point are obvious. Aside from the influence of one or more of the sources of error referred to in this paper, it must be remembered that there are rather wide variations within the normal limits. Consequently, any comparative results can at best show only the general tendency of the renal function during a period of rest as following exercise.

Although the total number of observations is too limited in this preliminary report to draw definite conclusions, the patients were selected with considerable care in order that sources of error might be reduced to a minimum. No patient was examined whose illness was likely to fluctuate during the period of testing and no one showing evidences of any enlarged prostate was included. The phenolsulphonephthalein was administered and determinations were made according to the usual technique described by Geraghty.⁴

The patients' records are grouped on the two charts according to the degree of exercise. Those on Chart I refer to healthy students, and patients at the City Home Hospital, where the opportunities for exercise were unusually good. The nine students included in this test actually walked continuously during the two-hour period with the exception of the few minutes necessary at the end of the first hour to collect the specimens. The others were either nurses on duty, or patients who were cooking, cleaning, etc., during the test.

On Chart II is the record of observations taken at the Memorial and St. Philips Hospitals, where the exercise consisted largely of walking and sitting in the wards.

Of the twenty-one patients recorded on Chart I, sixteen gave lower readings after exercise, three showed higher readings and two gave the same for both periods. It should be added that one of the three secreted an alkaline urine and gave an abnormally high reading (90 per cent) after exercise. According to Braasch and Kendall, the soda which she was in the habit of taking introduced a source of error. Studied collectively, this group excreted on an average of 6 per cent less dye after exercise.

Of the twenty-two patients recorded on Chart II eight showed a decrease after exer-

CHART I.

Case	ABSOLUTE REST		VIGOROUS EXERCISE.		DIAGNOSIS
	1st Hour	2nd Hour	1st Hour	2nd Hour	
			Total	Total	
1.	400cc. 17 %	800cc. 45 %	62 %	40cc. 35cc.	62 % Normal
2.	400cc. 37 %	400cc. 36 %	73 %	210cc. 200cc.	57 % Normal
3.	380cc. 55 %	180cc. 7 %	62 %	90cc. 100cc.	53 % Normal
4.	730cc. 62 %	325cc. 7 %	69 %	25cc. 45 %	50 % Normal
5.	240cc. 60 %	275cc. 7 %	67 %	115cc. 33 %	55 % Normal
6.	575cc. 65 %	230cc. 7 %	72 %	250cc. 150cc.	72 % Normal
7.	480cc. 30 %	500cc. 25 %	55 %	17 % 15cc	67 % Normal
8.	200cc. 52 %	100cc. 18 %	70 %	7 % 50cc.	67 % Normal
9.	400cc. 35 %	100cc. 22 %	57 %	70cc. 32 %	55 % Normal
10.	120cc. 25 %	80cc. 15 %	40 %	23 % 140cc.	35 % Ch. Hypertension
11.	160cc. 30 %	125cc. 22 %	52 %	80cc. 20 %	35 % Arteriosclerosis
12.	300cc. 28 %	240cc. 18 %	46 %	175cc. 42 %	57 % Gonorrhea
13.	290cc. 27 %	233cc. 18 %	45 %	125cc. 10 %	25 % Gonorrhea
14.	300cc. 45 %	240cc. 25 %	70 %	280cc. 80cc.	90 % Gonorrhea
15.	180cc. 45 %	140cc. 35 %	80 %	75 % 90cc.	68 % Pregnancy
16.	200cc. 45 %	110cc. 30 %	75 %	95cc. 40cc.	65 % Pregnancy
17.	150cc. 35 %	140cc. 20 %	55 %	30 % 20 %	50 % Var. Ulcers.
18.	230cc. 50 %	160cc. 35 %	85 %	120cc. 45 %	75 % Normal
19.	180cc. 42 %	125cc. 30 %	72 %	95cc. 30 %	55 % Normal
20.	350cc. 45 %	200cc. 40 %	85 %	160cc. 45 %	75 % Normal
21.	200cc. 35 %	200cc. 20 %	55 %	90cc. 22 %	52 % Syphilis

cise, twelve gave an increase after exercise and two were the same for both periods. In this group there was an average of 3.2-3 per cent. increase after moderate exercise as compared with the 6 per cent decrease after rather vigorous exercise.

According to these two series of observations, there appears to be a difference between the functional output of the kidneys following moderate exercise and that following vigorous exercise. In the former series, there was no definite trend in the variations between the two periods and apparently the type of exercise taken by those recorded in Chart II, had no appreciable effect on the excretion of the dye.

In Chart I, however, the phthalein return showed a general tendency to be less after vigorous exercise in sixteen of the twenty-one studies, while two of the others remained the same.

An explanation of this probable influence of vigorous exercise on the output of phthalein is not altogether clear. We, of course, know that not infrequently a transient albuminuria, together with casts, occurs following strenuous exercise, but it has not been our experience to find evidences of renal irritability after the type of exercise described in these experiments. It is conceivable that other urinary solids are temporarily withheld by the kidneys following vigorous exercise. So far as I have been able to ascertain, no one has published any data bearing on the effect of exercise on the excretion of urea, sugar, creatinine, etc. We are now conducting experiments covering this point.

CONCLUSIONS.

I. The phenolsulphonephthalein test is an index of tissue absorption and retention as well as renal excretion. Any deviation from

CHART II.

Case	ABSOLUTE REST			MODERATE EXERCISE			DIAGNOSIS
	1st Hour	2nd Hour	Total	1st Hour	2nd Hour	Total	
1.	{ 175cc. 20 %	150cc. 40 %	{ 150cc. 60 %	{ 200cc. 35 %		55 %	Post Typhoid
2.	{ 125cc. 20 %	200cc. 35 %	{ 100cc. 55 %	{ 175cc. 40 %		55 %	Post Typhoid
3.	{ 150cc. 20 %	110cc. 20 %	{ 165cc. 40 %	{ 100cc. 35 %		55 %	Card'io Renal
4.	{ 135cc. 20 %	175cc. 40 %	{ 155cc. 60 %	{ 125cc. 40 %		75 %	Tuberculosis
5.	{ 110cc. 30 %	75cc. 35 %	{ 175cc. 65 %	{ 110cc. 40 %		70 %	Puerperium
6.	{ 110cc. 30 %	125cc. 35 %	{ 110cc. 65 %	{ 75cc. 30 %		65 %	Malaria
7.	{ 100cc. 20 %	112cc. 40 %	{ 125cc. 60 %	{ 125cc. 40 %		75 %	Puerperium
8.	{ 75cc. 20 %	125cc. 20 %	{ 110cc. 40 %	{ 100cc. 40 %		70 %	Puerperium
9.	{ 100cc. 25 %	80cc. 35 %	{ 90cc. 60 %	{ 110cc. 35 %		70 %	Puerperium
10.	{ 400cc. 30 %	400cc. 25 %	{ 60cc. 55 %	{ 50cc. 20 %		60 %	Var. Ulcer
11.	{ 100cc. 30 %	750cc. 27 %	{ 100cc. 57 %	{ 80cc. 25 %		55 %	Tuberculosis
12.	{ 350cc. 50 %	300cc. 5 %	{ 280cc. 55 %	{ 100cc. 5 %		70 %	Ch. Hypertension
13.	{ 150cc. 40 %	500cc. 25 %	{ 150cc. 65 %	{ 170cc. 27 %		57 %	Tuberculosis
14.	{ 250cc. 60 %	200cc. 20 %	{ 250cc. 80 %	{ 400cc. 15 %		50 %	Fract. Radius
15.	{ 150cc. 40 %	500cc. 25 %	{ 150cc. 65 %	{ 170cc. 27 %		57 %	Tuberculosis
16.	27 %	22 %	49 %	7 %		47 %	Cataract
17.	20 %	20 %	40 %	22 %		52 %	Syphilis
18.	50 %	20 %	70 %	17 %		67 %	Pregnancy.
19.	30 %	15 %	45 %	18 %		30 %	Pregnancy.
20.	30 %	27 %	57 %	3 %		73 %	Gonorrhea
21.	22 %	47 %	69 %	17 %		67 %	Gangrene of Toe
22.	7 %	15 %	22 %	17 %		39 %	Var. Ulcer.

the normal in these processes will show a corresponding change in the total elimination.

II. Its output is not materially influenced by moderate exercise, but after vigorous exercise, there is a definite reduction of the dye as compared with the amount excreted following absolute rest.

III. The recognition of certain sources of error is essential to a proper interpretation of the test.*

Professional Building.

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SOME UNSOLVED PROBLEMS IN NEUROLOGICAL SURGERY.*

By ERNEST SACHS, M. D., St. Louis, Missouri.
Professor of Clinical Neurological Surgery,
Washington University School of Medicine.

The title of this paper implies that there are some problems in neurological surgery that have been solved, but when I say solved I do not mean that every phase of those subjects has been cleared up and settled, for it will always remain one of the great charms of our profession that practically everything is still in a state of flux. Our most cherished theories of but a few years ago have to be discarded. Neurological surgery has been developed in such very recent times that many of the views its exponents hold have not been sufficiently tried and tested to make them as positive as some of the fundamental theories of, for example, bacteriology.

The treatment and permanent cure of major trigeminal neuralgia (tic douloureux) we do

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understand, and these pathetic cases can be promised permanent relief by severing the sensory root of the fifth nerve from its origin in the pons. No case of tic douloureux that has had this operation done properly ever gets a return of pain. If the pain remains, the operation has not been completely done or the diagnosis was wrong; and we know now that pains occur in the face which are not true trigeminal neuralgia. But of the pathology of the disease we know nothing. There is no demonstrable pathological lesion, and the disease may be due to some physiological or chemical disturbance, or mayhap it is due to one of these greatly overworked causes, vitamins, ions or ductless glands. While the treatment of spinal cord tumors is perfectly clear and their removal is comparatively simple, the diagnosis and localization still offer many pitfalls, but of this I shall speak later. The treatment of certain types of brain tumor, the benign encapsulated endotheliomas, is also quite clear though here, too, both the diagnosis and treatment offer many difficulties.

But of the subjects that constitute our unsolved problems the following are a few:

The treatment of gliomas of the brain, of hydrocephalus, of mental deficiencies, and certain types of spastic cases both of cerebral and spinal origin. I shall, of course, not attempt to take up all these subjects, but shall confine my remarks to but three of them—the gliomas, hydrocephalus and spinal localization.

Forty-five to fifty per cent. of all brain tumors are gliomas. Gliomas are usually considered malignant tumors. Were this so, the problem would indeed be a desperate one; but gliomas lack one of the most characteristic signs of a malignant tumor: they never metastasize, they never invade the dura, but some of them infiltrate the adjacent brain tissue. It is a local disease and, if the tumor can be removed, there is no danger of its recurring elsewhere. This, then, is the crux of the problem, can the tumor be removed completely, and, if so, what are the best methods of doing this?

The first point to emphasize is that there are different kinds of gliomas—the solid and the cystic. The cystic gliomas are of three types. First, the simple cysts containing yellowish, gelatinous fluid with a small solid

gliomatous mass in one spot of the wall, but the rest of the cyst wall is not composed of gliomatous tissue; second, the single cysts composed of gliomatous tissue with no single nubbin of gliomatous tissue; and thirdly, the cases of multiple gliomatous cysts in a mass of solid tumor.

Of these three types, the first is the most favorable tumor we have in the brain. The emptying of the cyst or removal of the wall with the nubbin of tumor effects a permanent cure. At times the nubbin may be inaccessible or only partially removed, and then the cyst may refill in the course of months. Occasional evacuation of the cyst may keep the patient comfortable for a long time. Sometimes they cease to secrete and the patient remains well. Under what circumstances this happens and what factors influence this fortunate outcome we do not know.

The second type of gliomatous cyst in which the wall is all gliomatous is less promising, though here, too, removal of the cyst wall or destroying it by some cell fixative, as Zenker's solution, may give a permanent cure. If the cyst refill, it may be retapped but at times these cysts change into solid gliomatous tumors. The cases with multiple cysts must be considered with the solid tumors.

With the solid gliomas, the problem is a different one; can one remove a solid glioma? I have been struck by the fact that not all gliomas are infiltrating, but some have a definite line of demarcation though not a true capsule. My policy at present is, and has been for a number of years, to attempt to remove a tumor if I possibly can, for to leave a tumor means ultimate death; however, I do not attempt to remove every tumor. I have no rule of thumb by which I determine which tumor I shall remove and which I shall leave in even after I have exposed it. No two surgeons will absolutely agree on this point, for that rare indefinable quality known as surgical judgment, a twin of that rapidly disappearing quality known as the art of medicine, must be our guide. The two extremes at present, I think, are represented by the Mayo Clinic and the Baltimore Clinic. The former leave gliomas alone surgically; the latter attempt to remove everything. I agree with neither of these two policies but steer a middle course. To remove a tumor completely but leave the patient so seriously disabled that he is a burden to him-

self and his family, is a questionable triumph of surgery. It is similar to some of the victories in the recent war when conquered cities were mere smoking, battered walls. What is occupying my attention at present is trying to determine, if possible, either before or at the time of an operation, which are the removable gliomas. Diagnostically as yet we have not found any means of differentiating the various types of gliomas, but at operation a fairly accurate differentiation is possible. It is not even always possible to know before operation if one is dealing with a glioma, regardless of the type. A case that rapidly develops tumor symptoms is almost certainly a glioma, but I have seen cases that could readily be enucleated in spite of their very rapid growth.

Before taking up the second subject, it might be of interest to dwell for a few moments on certain factors that make these operations fairly safe, far safer than they have been in the past. These factors may be summed up in a few words.

1. Expert anaesthesia controlled by careful, frequently repeated blood-pressure observations.

2. A trained corps of assistants.

3. Improvements in the technique of the surgical procedures, and, if necessary, doing the operation in several sittings.

4. Making free use of blood-transfusion as a post-operative stimulant.

For the anaesthesia, I believe a trained anaesthetist is essential, one who knows how to handle cerebral cases, for these are different from the ordinary surgical cases. The depth of anaesthesia must be much lighter than for an abdominal case. We have found the Connel percentage ether apparatus particularly valuable. With an expert anaesthetist, I have not felt the need of using local anaesthesia except very occasionally.

As regards the other three factors, I just want to say this. Work in the intracranial cavity is enormously simplified if the problem of the cerebrospinal fluid is properly handled. The free use of ventricle-puncture is a *sine qua non*. I have never seen any harmful effects come from the withdrawal of cerebrospinal fluid by ventricle puncture. The reduction of intracranial pressure by withdrawal of cerebrospinal fluid is essential. Occasionally the ventricles are collapsed, and then the surgeon faces a most difficult situa-

tion. Hypertonic salt solution or even lumbar puncture may be necessary, though the latter procedure I consider very precarious in cases of increased intracranial pressure.

Blood transfusion we are using very freely. In the past two years we have transfused twenty per cent. of all craniotomies and, of the eighty tumor cases in this series, thirty-one and a third per cent. were transfused. Blood is certainly a much more effective post-operative stimulant than normal saline. If the patient's blood pressure has dropped markedly at the end of the operation, we usually give 500 c.c. of blood by the syringe method. We prefer this to citrated blood as we get far fewer reactions. I am quite sure that on a number of occasions we have given blood when salt solution might have accomplished almost as much, and consequently we have been criticised for this, but the remarkable effect it has on patients after a long operation makes me continue this practice.

Hydrocephalus still remains a difficult problem. The cases of hydrocephalus associated with cerebellar tumors I shall not consider, for the removal of the tumor relieves the hydrocephalus. I refer to the case of hydrocephalus due to obstruction by inflammatory processes around the fourth ventricle or aqueduct of Sylvius, and those cases of hydrocephalus now called communicating hydrocephalus. The type of hydrocephalus must first be determined. Dandy's method of injecting a neutral dye into the ventricle and observing its excretion I have discarded, as we had such alarming temperature reactions from the injections. I have returned to the old method of doing a double puncture, ventricular and spinal, and connecting each needle with a glass tube and noting if the fluid rises to the same height in both tubes. If it does, we have a communicating hydrocephalus; while if the fluid stands at different levels with the patient lying on the side, we have an obstructive hydrocephalus. For the latter type I have been doing an operation for the last seven or eight years which is comparatively simple and seems to be effective. I make an opening over the fourth ventricle and allow the fluid to escape into the subcutaneous tissues where it can then be absorbed. If the obstruction is above the fourth ventricle, some such method as Dr. Dandy has described must be used to

open the aqueduct of Sylvius. This increases the danger of the operation tremendously, and has thus far not led to very good results. I have tried it two or three times but have no successful case.

The treatment of the communicating hydrocephalus is indeed an unsolved problem. Dandy's suggestion of limiting the source of the cerebro-spinal fluid by removing the choroid plexus seems the only rational one, but it is a severe surgical interference. I have done it four times. In one infant the head ceased to enlarge, but five months later the child died of a pyelitis, so that I cannot express a positive opinion about the permanent value of the method.

Hydrocephalus may properly be called an unsolved problem, but now that we know how to differentiate the various types, we can deal with these cases more intelligently. A recent experience illustrates this very well. A child of four weeks began suddenly to develop hydrocephalus. It had been a premature infant and had a temperature of 107° the day after its birth. The temperature then fell to normal. The child did not gain and there was constant feeding difficulty. At four weeks, Dr. Tuttle, who referred the case to me, noted hydrocephalus. Lumbar puncture revealed a yellow fluid full of flocculi; culture was negative. Removal of spinal fluid did not influence the hydrocephalus. Spinal puncture, the next day, yielded only a few drops. Ventricle puncture showed the same yellow fluid. We evidently were dealing with an intraventricular birth-hemorrhage which had caused an obstructive hydrocephalus. As the child was failing rapidly, I attempted something that, as far as I know, had not been done before. A ventricle needle was put into each lateral ventricle and the ventricles were irrigated out with normal saline. Following this, lumbar puncture yielded a copious flow of cerebro-spinal fluid, and now the cerebrospinal fluid is normal, the head has ceased to enlarge, and the child is gaining steadily.

markedly, they do not destroy the cord as a tumor growing in the substance of the cord may do.

Our greatest difficulty still consists in determining whether the symptoms of a focal spinal lesion are due to tumor or some other process. In the first ten or fifteen years, when spinal tumors were being operated upon, following the epoch making monograph by Victor Horsley and Gowers, two points were considered essential to warrant the diagnosis of spinal tumor. One was pain, the other was the progressive character of the disease. If a case did not present one of these two features the diagnosis was not deemed justifiable. We know today, however, that a patient may have no pain and still have a spinal tumor; and there may be a remission of symptoms and the spinal symptoms nevertheless be due to a spinal tumor. It has been claimed that only those spinal tumor cases have no pain that are intramedullary, that is, have their origin in the substance of the cord. To determine that point, some years ago I reviewed all my spinal tumor cases and found that in my own series pain was not such a prominent symptom and that quite a number of extra-spinal tumors, that is, meningeal tumors, produced no pain. In addition to this, I found that even in those cases that had pain this symptom was not the initial or most prominent one. I believe that pain in spinal tumors only occurs when the posterior nerve roots are involved or pressed upon, while if the tumor lies between roots (and this may occur particularly in the dorsal region where each segment is rather long) there may be no pain. In my series the initial symptom was some form of paraesthesia: burning, pins and needles, or formication, and this symptom is so indefinite that not a few of the cases, before they finally get relief, have become so discouraged that they consulted osteopaths or chiropractors. These paraesthesias have preceded objective findings, such as pathological reflexes or anaesthesia, by many months; and on purely subjective symptoms none of us would be willing to make a positive diagnosis.

The remission in symptoms may well be explained by changes in the vascularity of the tumor. Two cases in my series illustrate this point strikingly. One was a fibroma. On removing the tumor it was found to have practically no blood supply, and microscopic

Spinal surgery offers us a number of problems on which we want more light, but it also has reached a far more satisfactory stage than the surgery of hydrocephalus. Spinal tumors are favorable cases for operative removal as the majority of them grow from the meninges, and though they may compress the cord very

sections showed very few and extremely minute vessels. At one time this patient had been totally paralyzed but, when he came under observation, he had some sensation and some movements in his lower extremities. While this tumor was growing I believe it had a good blood supply, and then the tumor had cut off its own blood supply by pressure and consequently had shrunk, thus giving more room to the spinal cord. The other case was that of an angioma of the cord. This patient had periods of complete paralysis, and then again marked periods of remission. She had consequently been diagnosed as an hysterical paralysis by her physicians in Russia, and they had employed on her the drastic methods that had been used in the army on functional cases, but of course without avail.

If pain need not be present and the symptoms are not continuously progressive, how shall we determine if the picture of a transverse myelitis is due to tumor? One point is of great value. Cord tumor symptoms come on fairly slowly, at least in the course of a few weeks, while myelitic symptoms from other causes usually develop much more rapidly. The character of the line which marks the beginning of the disturbed sensation is sometimes said to be different in tumor cases than in myelitic cases. Increased reflexes, paralyzed muscles and disturbed sensations are observed in focal spinal lesions regardless of the cause and therefore they will not assist in the differentiation. The history of the case and the character of the line of changed sensation are almost the only points of value; there are cases in which it is impossible to determine if the paralysis is due to a tumor or not. In these cases the injection of air into the spinal canal and taking an X-ray picture may be of value, or the test of Ayer, of Boston, by which he determines if there is a spinal block; but Ayer himself has pointed out that spinal tumors do not always produce such a block. I still feel, therefore, that the old dictum of Victor Horsley should not be discarded, that every patient with the symptoms of a focal spinal lesion has not been given a fair chance unless he has been explored.

The determination of the exact level at which a lesion is located requires a most careful study of the disturbances in sensation as well as changes in reflexes and motor power. I find that there is a surprising carelessness

on the part of many men in making sensory examinations. If there is merely diminution in sensation, not complete loss, the greatest care has to be exercised. To examine a patient with but part of his clothing removed may lead to serious error for, where fine distinctions in sensation are being studied, the weight of the clothing may confuse the most intelligent patient. In finding the region in which normal sensation begins one should always examine from the abnormal to the normal area. The patient must always be lying down, and the examining room should be warm. The usual tests, of course, are made with a needle and cotton wool, and, as a rule, these are much more satisfactory than testing disturbances in temperature sense, but occasionally temperature disturbances are more valuable guides. I recall one instance where I was only able to establish the sensory level by means of a piece of ice.

These remarks about methods of examination no doubt seem very elementary to most of you. My reason for mentioning them is that they are so frequently disregarded.

I have endeavored this evening to outline for you some of the solved and unsolved problems which are occupying the attention of neurological surgeons. It is one of the most fertile fields for clinical research. It has made great strides in the last decade, and during the next decade unquestionably many of the unsolved problems will be still further elucidated.

THE GROWING IMPORTANCE OF MAPPING FIELDS OF VISION.*

By W. E. DRIVER, M. D., Norfolk, Va.

It is almost impossible to over-emphasize in treating diseases of the eye today the importance of locating in its earliest stages any form of progressive trouble with the optic tract as well as with the eye proper. In other words, the eye surgeon, or oculist, is the guardian of the whole eye apparatus when the sight is in jeopardy. The value of his service to his patient is in direct proportion to his ability to *determine* the source of every interference with the vision and his ability to remedy such defects.

The fact that an oculist will examine a patient and fit glasses to his eyes that enable

*Read at the meeting of the Virginia Society of Otolaryngology and Ophthalmology in Roanoke, April 13, 1922.

him to see does not demonstrate by any means that he has gone to the seat of the trouble and found the underlying causes of the symptoms manifested. This is often shown by the continued trouble a patient may have, as headaches, the necessity for frequent change of glasses, and increasing hyperopia. It is now a well established custom that persons suffering from headache for any considerable length of time, or other troubles that seem due to the eyes, consult an oculist at once, without reference to the family or general physician, to learn whether or not the trouble may be due to the eyes. This, obviously, has increased to a large extent the responsibility of the oculist in making his examinations.

Certainly it has been conclusively demonstrated in the last half century that the mapping of the fields of vision is the most illuminating of all methods of recognizing interference with the visual tract. The careful plotting of the visual fields in securing reliable records of affections of the eye and optic tract requires both time and patience, but after years of experience in this work, I can only repeat that such mapping is the *most accurate* means of estimating the need for specific treatment.

If, in the case which I am citing below as an example of my point, the patient had been under careful observation, and accurate charts of his field of vision had been plotted at the time he was first sent to the hospital, probably his sight could have been saved.

The following is the history of a case which came under my personal observation and one which particularly illustrates my argument.

"Hypophyseal struma with primary optic atrophy and bitemporal hemianopsia. Dyspituitarism with evidences of former activity. High sugar tolerance. Chronic hypoglycaemia. Operation. Partial extirpation of growth.

HISTORY: June 1, 1910. B. C., a coach painter, was referred to the hospital by Dr. C. M. C., complaining of loss of vision. One of a large family of healthy children, he enjoyed a fair measure of health himself until his present trouble. The usual infantile infections were followed by a very severe typhoid and a secondary pneumonia at 14. He subsequently *grew very rapidly*, and at 17 measured six feet in height. At 23 he had another attack of typhoid and at 28 pleurisy.

Apart from these illnesses the patient has been well; a hardworking man of more than average physical strength. He has used tobacco to excess and alcohol abundantly, but otherwise has had no vices. Though he works constantly with white lead and oil, he has never had any occupational colic or neuritis. He has been married five years and has one healthy child.

PRESENT SYMPTOMS: In March 1909 he accidentally observed that vision in the left eye was dim. It has progressively failed. He has had occasional temporal *headaches*, but they have not been frequent or severe, no nausea or vomiting. *Photophobia*, with aching pain in the eyeballs, has been his chief source of annoyance.

At the time of his first admission in June, 1910, although the fields of vision aroused some suspicions, the X-ray plate was inconclusive, and expert ophthalmological opinion was emphatic that the condition was a typical *lead or tobacco amblyopia*. A gloomy prognosis was given; he was given large doses of potassium iodide and *discharged*, the visual acuity in the left eye having dropped markedly during the two weeks he was under observation.

August 10, 1911. Readmission. The patient, by good fortune, was seen by Dr. W., who found a typical bitemporal hemianopsia, and he was advised to re-enter the hospital."¹

Mapping fields of vision, to be sure, is subjective, but it is not as misleading as one would suppose when it is done by skilful persons. Dr. Cushing, in his article entitled "Distortions of the Visual Fields in Cases of Brain Tumor"² (1911), mentions the fact that patients had brought to him charts on which the fields of vision had been plotted elsewhere, but as a rule they had been so casually mapped that they were too unreliable for diagnosis. He says: "Too few circumferential points are usually taken, and the cards, as a rule, are so small that the color interlacing, on which we have come to lay such stress, is not apparent. Furthermore, a number of our best illustrations of hemiachromatopsia were entirely overlooked on tests made shortly before the patients' admission to the hospital, the fields of form alone having been recorded."

Albrecht Von Graefe³ was the first to call attention to the importance of testing the visual field in ophthalmic practice. He showed that for many intra-ocular diseases there are special varieties of contraction of the visual field, which are more or less characteristic of these diseases, and can be utilized for this diagnosis. Since then (about 1860) the visual field has been much cultivated, so that at present its examination has great significance, both for diagnosis and prognosis.

The importance of mapping fields of vision in diagnosing intra-ocular diseases was conclusively demonstrated by Von Graefe, and since that time much has been added to the methods used in the accurate plotting of the visual fields. Among those who have followed Von Graefe's discoveries along this line and perfected the methods of plotting have been Soelberg Wells, Donders, Bjerrum, de Schweinitz, Wilbrand, Cushing and Walker.

In his *Treatise on Diseases of the Eye*,⁴ Soelberg Wells (1868) says: "Besides examining the acuteness of vision, it is often of much importance to ascertain with accuracy and care the condition of the field of vision." Wells did not use the graduated disks in determining the field of vision, but plotted the periphery of the field of vision on a black-board by using chalk held in a dark handle while having the patient keep his eye on a certain spot in the center of the board.

De Schweinitz (1892-1916) plots a field of vision in much the same manner as Wells, when he wishes a field not larger than 45° in extent. For a larger field, in determining the periphery of the retina, he uses the perimeter. This, as is well known, consists essentially of an arc marked in degrees, which rotates around a central pivot, that at the same time may be the fixing point of the patient's eye. The test object, 1 to 2 cm. in diameter, affixed upon a carrier, is moved from without inward and the point noted on each meridian where it is recognized.

"Bjerrum, in 1899, proposed an addition to the usual method of examining the field of vision. The addition consists in making use of white objects which subtend a very small visual angle. The examinations are made at a distance of two meters, using a large black screen two meters in breadth, which can be let down from the ceiling to the floor. At this distance, the blind spot, instead of measuring 2.5 mm., as on an ordinary perimeter, measures 20 mm. in diameter, and everything else in the same proportion.

"The objects used by Bjerrum are small circular disks of ivory fixed on the end of a long black rod. They vary from 10 to 1 mm. in diameter.

"The examination is begun in the ordinary manner (at 30 cm.) with the 10 mm. disk, and then continued at two meter distance with a 3 mm. disk. In the first case the visual angle approximately is two degrees, in the second five minutes. This method is valuable in finding section-shaped defects, irregular limitations, and scotomas, and should supplement ordinary perimetric work in all important examinations."⁵

Clifford B. Walker, in Harvey Cushing's service, in his examinations of patients with intracranial lesions, finds it necessary to investigate the field of vision for test objects

varying in visual angle from one or two minutes to about 8° and has designed a series of circular rimless colored and white disks, supported on wire handles, which cover the required range, taking the "normal" of 5 mm. disk as the unit. In this series the smallest disk is 0.15 mm. and the largest 4 cm. in diameter. His special perimeter has a radius of 28.6 cm. and a large working surface 66° by 130° in extent.⁶

Clifford Walker has gone further than this in the study of defective retinal areas with a series of large disks.

Although there is more labor involved and in some instances there seems little to be learned in a further plotting of the fields, as a matter of fact there is much more to be learned, though the information obtained throws more light on the prognosis than on the diagnosis. The large disk is rather of more value in advanced cases which are to be carefully watched before and after operation; even though the small or normal disks may show very little change, although active changes may be going on in those parts of the retina found to be defective to the normal disk, both before and especially after operation.

Examination with large disks should be made on all field defects whether of anterior or posterior origin. The results are much more striking in anterior lesions than in posterior, and this is true to such an extent that it is useful as a diagnostic point in differentiating anterior and posterior lesions.

In the instance of cases presenting themselves for operation with rather damaged fields and a diagnosis of a lesion in the chiasmal region, all knowledge possible is necessary concerning the visual prognosis and the state of the defective retina before operation. After operation it is necessary to detect the earliest improvement in the defective area and to follow its progress. The very small disks may show very little change, while a series of large disks may show marked improvement in the field. The inner field represents the normal disk. The next larger field is taken with a disk twice the normal diameter; the third outer field is taken with a disk of twice the diameter of the previous disk or four times that of the normal disk, and likewise the outermost disk is twice the diameter of the next inner or eight times the normal disk.

The small disks are not shown in this first series, but the same relation between disks holds down to the smallest which has a visual angle at perimetric distance of about 1.7 minutes, close to the limit of visibility. Of course, when there is scotoma, the order of the disks is reversed, the inner border representing the larger disk, and the outer border the normal disk, so that if there are less than four margins in a scotoma, it means that a corresponding number of the largest disks are seen in the scotomatous areas and therefore are not recorded.

Some of the diseases most readily diagnosed by examination of the visual fields, with details of diagnosis, are briefly described as follows:⁷

GLAUCOMA SIMPLEX: A form of glaucoma with no pronounced inflammatory symptoms, but attended with progressive loss of vision.

The contraction of the visual field begins most frequently on the nasal side. A very frequent, according to some, constant, change is an up-and-down elongation of the blind spot, so that a sickle-shaped scotoma is produced (Bjerrum) arching above or below round the fixation point and even reaching the horizontal meridian on the other side of the latter (Ronne). In this way an annular scotoma may ultimately develop. In glaucoma simplex central scotomata may occur, so that with a large field of vision the central visual acuity is impaired early. The reverse also occurs; that is, a marked concentric contraction with good central vision.

OPTIC NERVE ATROPHY: The atrophy of the optic nerve fibres is the most important cause of the decrease of visual power which accompanies the elevation of tension. Impairment of both direct and indirect vision occurs. The former finds expression in the gradual diminution of acuity of central vision, the latter in the limitation of the field, which begins in the majority of cases on the nasal side, as the temporal side of the retina becomes insensitive first. Finally complete blindness supervenes.

With the diminishing sight is associated progressive restriction of the visual field (usually under the form of progressive concentric contraction or of sector-like defects, rarely under that of a central scotoma).

The field of *colors* is affected before that

for white objects, the field for red and green disappearing early, and later that for blue.

By this fact **ATROPHY** is distinguished from **GLAUCOMA SIMPLEX**, which sometimes shows much resemblance to it, but which is not ordinarily associated with color blindness till late in its course.

Atrophy of the optic nerve due to disseminated sclerosis is characterized by an irregular course, at times by transient improvement of sight, and rarely leads to complete blindness. It is unilateral. The field varies, but a central scotoma is relatively frequent.

OPTIC NEURITIS: Subjective symptoms consist in defective sight; in severe neuritis complete blindness. Marked swelling with normal sight does also occur. Characteristic of many cases of neuritis is a sudden and momentary obscuration of sight, repeated often. Contraction of the *field of vision* is often found, sometimes under the form of hemiopia. Sometimes the only anomaly of the field is an enlargement of the blind spot.

Brain diseases are by far the most frequent cause of optic neuritis. They lead to disease of the optic nerve, either through producing congestion or transfer of inflammation.

The diseases of the brain which are complicated with *optic neuritis* are partly focal, partly diffuse affections. Above all it is the tumors of the brain which result in neuritis, usually under form of choked disk. Neuritis in this case is so frequent, said to be wanting in only ten per cent., some say more, of cerebral tumors, that it forms one of the most important symptoms. Accordingly, in every case in which there is a suspicion of the existence of a cerebral affection, the fundus of the eye should be examined with the ophthalmoscope.

In a report by Cushing, 1911, he mentions that cases of brain tumor causing visual defects seemed rapidly increasing, as of the 200 cases reported on, covering an interval of five years, eighty-two of them had come under observation during the last twelve months.

TUMOR OF THE BRAIN: Von Graefe was the first to distinguish the inflammations of the optic nerve *accompanying diseases of the brain* into congestive neuritis (choked disk) and descending neuritis.

RETINITIS PIGMENTOSA: A special variety of atrophy which runs a very chronic course is the pigmentary degeneration of the retina.

It is marked by such characteristic subjective symptoms that the diagnosis can be made almost from them alone. Persons affected with this disease complain that they see worse at night, or whenever illumination is reduced. Examination of the field of vision discloses the cause of this phenomenon.

In the beginning of the disease the visual field, when taken with good illumination, shows a broad blind zone between the center and the periphery (an annular scotoma). Central vision is good, because the periphery of the retina functions, orientation is good too, so that the ring-shaped defect in the visual field is not noticed. The peripheral portion of the retina, however, is undersensitive and, when illumination is diminished, it no longer functions, and then the periphery of the visual field disappears just like the portion that corresponds to the ring scotoma, so that the patient has left only the small central portion lying inside the latter.

In feeble illumination, therefore, orientation is no longer possible for him. And even the central portion of the retina is damaged, because the light sense in general is reduced, and hence the liminal stimulus is increased; that is, the minimum quantity of light required to stimulate the retina is greater than in a normal eye. As the disease advances, the periphery of the retina becomes entirely blind, so that even in good illumination nothing but a small central portion of the visual field is left, and the patient can scarcely guide himself alone even in daytime. At the same time direct vision may be so good that the patient may be able to do fine work. Finally, central vision too is lost, so that complete blindness supervenes, but not usually until late in life.

DETACHED RETINA: The retina separates from the pigment epithelium even more readily than the choiroid separates from the sclera (as it does for example after operation); and the dreaded detachment of the retina is nothing but the retransformation of the virtual cavity of the ocular vesicle into a real one.

Detachment of the retina is diagnosticated by means of the ophthalmoscope, which shows the detached retina under the guise of a delicate gray membrane that rises above the level of the normal fundus and projects toward the vitreous. Exteriorly the eye looks normal, only the anterior chamber is often

strikingly deep and the tension is diminished.

The subjective symptoms of detachment of the retina consist in the disturbance of vision that it causes. This is characterized above all by a limitation of the field of vision, corresponding in location to the detached portion of the retina, which has partially or entirely lost its sensitiveness to light. If, as is so frequently the case, the detachment lies below, the patient complains of a dark curtain which veils from him the upper part of objects. For instance, he does not see the head of a man standing in front of him. Hence, the examination of the *field of vision* is of great importance for the diagnosis of detachment of the retina.

STRABISMUS: The vision of those who are affected by strabismus is distinguished from that of one-eyed people by the greater extent of the *field of vision*. In the case of a person who squints with his right eye, the exclusion of the right eye from the visual act is done only to avoid diplopia, and hence, is limited to those objects which throw their images in both eyes at once, that is, to those which are found in the portion of the visual field common to both eyes. The case is otherwise when the object passes into the temporal field of the squinting eye where it can no longer be seen by the other eye because hidden from it by the nose. Then the image of the object is not suppressed by the squinting eye. Hence, the field of binocular vision of a man with squint is about as large as that of a normal man.

The temporally situated portion of the visual field, for which there is no suppression of the images, corresponds to the innermost portions of the retina of the squinting eye.

CHOROIDO-RETINITIS: An inflammation that affects predominantly the outer layers of the retina, adjoining the choroid, will scarcely run its course without implicating the choroid too. Conversely, it is obvious too that choroiditis cannot exist without the portions of the retina immediately adjacent participating in the process. From an anatomical standpoint, every choroiditis is a retinochoroiditis, or chororetinitis, although the term is not generally used unless ophthalmoscopically visible signs of inflammation can be demonstrated to exist both in the retina and in the choroid.

In this disease the exudates from the choroid pass not only into the superimposed retina,

but also through the latter into the vitreous. Opacities thus produced are hence almost a constant accompaniment of chroiditis.

The vision is diminished as a whole on account of the cloudiness of the vitreous and the hyperaemia of the retina. But in those spots in which inflammatory foci exist, sight may be entirely abolished, so that scotomata are present in the field of vision. Owing to the fact that the retina over the focus of inflammation is pushed forward and its elements are displaced from their normal situation, objects whose images fall on the retina may appear distorted (*metamorphopsia*); straight lines, for instance, appear bent in various directions. Frequently also objects appear smaller than they really are (*micropsia*), or in the atrophic stage look larger than they are (*retinal macropsia*).

When, after the subsidence of the inflammation, atrophy of the choroid and of the superimposed layers of the retina has taken place, signs of absence of function, *gaps in the field of vision*, take the place of the signs of irritation.

This disease is chiefly dangerous because of its tendency to recur, in consequence of which new foci of inflammation are constantly developing in the choroid. With this is ultimately associated atrophy of the retina and optic nerve, so that obstinate cases of choroiditis terminate in partial or total blindness.

METAMORPHOPSIA: Is the condition in which objects appear distorted. It is found in pre-choroido-retinitis.

Metamorphopsia may be due to defects in the refractive media (astigmatism, especially of the irregular kind), refractive metamorphopsia, or to displacement of the retinal elements. The latter occurs when the retina is lifted up by an exudate (retinitis, choroiditis) or an underlying liquid or growth. If the process is such that the retinal elements are spread apart, as for instance occurs in a recent choroiditis or retinitis, an object looked at will look smaller than it is (*micropsia*). This is because a retinal image, that would normally occupy three retinal elements, now owing to the distention of the retina, occupies but two, and hence affords an impression corresponding to that afforded by an object of two-thirds the actual size of the object looked at. On the other hand, when the retinal elements, are abnormally crowded together, as occurs in the atrophic stage of retinitis and

choroiditis, objects look larger than they really are (*macropsia*).

In the beginning of detachment of the retina objects frequently appear crooked, in consequence of the oblique position of the percipient retinal elements.

EFFECTS OF DRUGS ON THE FIELD OF VISION:
Strychnine: This exerts an excitant action upon the optic nerve, so that even in normal eyes it produces a slight, although not permanent increase in the visual acuity and an enlargement of the field of vision.

It acts best in disturbances of vision unattended by changes visible with the ophthalmoscope, especially in hysterical and neurasthenic forms, which, however, generally afford a good prognosis anyway. In serious lesions of the optic nerve, as in progressive atrophy, we often obtain with it an improvement in the sight and especially an enlargement of the *field of vision*; but these changes are not permanent.

Quinine: In acute quinine poisoning (after doses of less than one to three gm. or upwards), sudden blindness sets in with hardness of hearing. In most cases the blindness disappears again gradually but incompletely, amblyopia and a markedly contracted *field of vision* remaining permanently.

Anatomical investigation shows in the first days of quinine poisoning a destruction of the ganglion cells of the retina, and as a result of the death of the ganglion cells a degeneration of the nerve fibres of the optic nerve very soon sets in.

Tobacco and Wood Alcohol: Nicotine and alcohol amblyopia are due to chronic poisoning by these substances, nicotine poisons more often than alcohol. In this country there have been many cases of methyl-alcohol poisoning—in a few cases this has occurred from inhalation of the vapor (as shellac workers), but generally from drinking cheap liquor, jamaica ginger, or other liquids which have been adulterated with deodorized wood alcohol. Blindness is almost always complete and permanent.

In nicotine poisoning, disturbance of vision sets in very gradually. The reduction of the visual acuity is most always the same in both eyes, a fact that distinguishes this from other intra-ocular affections, such as cataract, choroiditis, atrophy of the optic nerve.

In this poisoning, objective examination shows but *slight ophthalmoscopic change*.

Examination of the *vision* shows a moderate diminution of the visual acuity which has its cause in central scotoma. No gap is found in the field of vision if tested by means of a white object, but a red or green mark undergoes a change of color in the region of the scotoma. The outer limits of the visual field always remain normal and complete blindness is therefore not to be apprehended, but direct vision is destroyed, and with it the ability to carry on any fine work.

ENLARGEMENT AND TUMORS OF THE HYPOPHYSEAL GLAND: With tumors of the brain there may occur not only congestive neuritis, but also descending neuritis and simple atrophy of the optic nerve. Simple atrophy may be produced because a tumor exerts a direct pressure upon the chiasm or the optic tracts, and thus causes their effacement.

An example of this is furnished by the interesting cases of tumor of the hypophysis, which, by pressing upon the chiasm causes atrophy of the optic nerves with temporal hemiopia.

In all cases in which the defect in the visual field is contained in one eye only, or in which, while there are defects in both eyes, they are not symmetrically situated, the lesion must be situated in the *optic nerve* itself, that is, in front of the chiasm. In temporal hemiopia the lesion is seated in the chiasm itself and is so placed that only the decussating fibres are affected by it. It most often occurs as an enlargement of the hypophysis cerebri. The symptoms vary, depending on whether the degeneration affects the glandular or the nervous portion of the hypophysis.

Unquestionably the hypophyseal gland is capable of great histological alteration at different ages and under different stimuli. Even in the case of actual enlargements to which the gland is subject and the tumors peculiar to its vicinity, there has been great disparity in the interpretation as well as in the nomenclature applied to the lesions.

Degeneration of the hypophysis causes the eye to suffer, although indirectly, owing to pressure of the enlarged gland upon the optic nerve. Thus it is often the case that the ophthalmologist is the first to discover a diseased hypophyseal gland.

One can readily see the growing value from the diagnostic point of accurately mapping the field of vision. As an aid to diagnosis its value can be compared to the X-ray and the

Wassermann test in other branches of medicine. The neurological surgeons have emphasized the importance of this subject more than the eye surgeons, up to this time, which is an unwarrantable position.

In connection with the foregoing effort to demonstrate the importance of examining the field of vision, especially for diagnostic purposes, I wish to mention the investigations made by Dr. C. E. Finley, of Havana, Cuba. In his paper, "Bitemporal Contraction of Visual Fields in Pregnancy," presented before the International Congress of Ophthalmology in Washington, April, 1922, Dr. Finley clearly demonstrates that the "normal hypertrophy of the pituitary body which takes place in connection with pregnancy," in about seventy per cent. of such cases, produces "a compression of the chiasm which manifests itself by changes in the visual fields, in the nature of a bitemporal contraction, which varies in degree according to the amount of compression suffered."⁸ Such contraction, however, it should be clearly understood, is the result of the state of pregnancy, and not the indication of permanent interference of the optic tract.

Besides the accurate mapping of the visual fields and the careful diagnosis that may be derived therefrom, I wish to stress particularly the fact that the eye surgeon should be able to remove and clear obstructions from the eye tract. There should be no part of the eye or its appendages with which he is not familiar enough to administer surgical and medical treatment.

For instance, in gumma, a syphilitic condition affecting one of the extra ocular muscles, the eye surgeon will not think for a moment of calling in outside assistance, but on the other hand, usually when he has determined from the mapping of the field of vision that a patient has an interference of the optic chiasm by an enlarged hypophyseal gland, he throws up his hands in horror and immediately calls upon the neurological surgeon, or the endocrinologist, for assistance. Diseases of the hypophyseal gland affecting the optic tract are so eminently a part of the eye surgeon's field that he should without question be qualified to cope with them.

201 West Freemason Street.

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MATERNAL MORTALITY IN RICHMOND: A PRELIMINARY SURVEY.*

By C. C. HUDSON, M. D., Health Officer,
and

M. P. RUCKER, M. D., Chairman, Midwife Examining Board,
Richmond, Va.

"Maternal Mortality, a Crime of Today" is the title of a recent paper by C. Henry Davis.¹ That the high maternal mortality which still pertains in spite of the tremendous advances in the medical science of the past fifty years is a reflection upon the medical profession, public health work and the public in general, we all agree, but that it is a modern crime is open to considerable doubt. Maternal mortality certainly existed in the time of the patriarchs, for it is recorded² of Rachel that "when she was in hard labor, that the midwife said unto her: Fear not; thou shalt bear this son also. And it came to pass, as her soul was in departing (for she died), that she called his name Benoni; but his father called him Benjamin." How frequently such calamities occurred in ancient times it is, of course, impossible to tell. The earliest records available for such a study are those of the Registrar General for England and Wales, and these, according to Victor Bonney,³ show that the death rate, directly and indirectly attaching to pregnancy and labor, has diminished woefully little in the last seventy years. A study of the maternal mortality in the United States from 1890 to 1913, by Grace L. Meigs,⁴ of the Children's Bureau, U. S. Department of Labor, indicates that there is, if anything, a slight increase. She makes the statement that "child bearing in this country is a greater hazard to women of child bearing age than any disease except tuberculosis." Louis I. Dublin,⁵ the statistician for the Metropolitan Life Insur-

ance Company, says that deaths of women from puerperal causes affect the community deeply, because they occur at periods of life when each death involves serious loss, often causing a dissolution of the family.

The actual risk of child bearing cannot be determined exactly from statistics, as they have been kept. Rongy⁶ makes the suggestion that birth certificates should have on the back spaces for certain facts about the mother and child, such as presentation, instrumentation, duration of labor, eclampsia, placenta previa and (we might add) pituitrin. There are, however, a number of ways more or less accurate of arriving at some conclusions. Davis¹ went over 5,000 consecutive life insurance examinations in the office of the Northwestern Mutual Life Insurance Company, and found that one applicant in seven had a mother or a sister or both to die from the immediate effects of childbirth, one in 27 from tuberculosis, and one in every 47 from malignant disease. Rongy⁶ compared the number of deaths from puerperal causes to deaths from all causes and found that in the Bronx, in every 1,000 deaths, 7.3 were due to childbirth, and 8.7 if we include abortions. Another way of studying this question is to compute the mortality rate for women between the ages of 15 and 44. This was done by Dublin.⁵ His material consisted of 14,694,260 women carrying industrial insurance in all states of the Union, and he found a death rate of 68.4 per 100,000 women between the ages of 15 and 44, 66.1 for white women and 82.3 for negroes. Septicemia was responsible for 43% and toxemias for 26.4%. Harrar⁷ studied the records of 101,197 deliveries at or near term at the New York Lying-in and found one maternal death in 317 out-patient deliveries and one in every 212 hospital cases.

Death rates from puerperal causes are usually computed in one of two ways by Health Departments. The usual way is to calculate the rate as so many deaths per 100,000 population. Another way is to use the number of births as a basis for calculation. The number of live births reported are now reasonably accurate. Howard⁸ states that a truer rate would be obtained by comparing the maternal deaths with the actual number of deliveries. This is what he calls the real risk-rate of maternity. There are various sources of error inherent in either method. The principal sources of error for Richmond are as follows:

1. The deaths in our hospitals of compli-

*Read before the Richmond Academy of Medicine and Surgery, February 13, 1925.

cated cases brought in for treatment from outside the city.

2. Deaths from infection following abortions and stillbirths. (21.7% of all puerperal deaths).

3. Incompleteness of birth records in estimating maternal deaths per 1,000 births. (Probably 5%).

4. Multiple births.

5. Acute and chronic diseases complicating pregnancy and labor.

In the past three years a special study of all deaths from puerperal causes in Richmond has been made by the Health Bureau and it has been found that 14.7% of all puerperal deaths belonged in class 1. These were complicated cases brought to the various hospitals on account of the complications. In the same three year period 21.7% of the puerperal deaths were incident to abortions and premature deliveries. This causes an unduly high rate when the rate is based upon the number of live births. Both of these factors are very important in increasing the death rate from puerperal causes in Richmond. The incompleteness of birth records, amounting possibly to 5%, still further increases the death rate when computed on the basis of 1,000 live births reported. The error occasioned by the birth reports of multiple births, amounting to about 1 to 2%, works in just the opposite way from the preceding three years, and would tend to slightly lower the rate. The fifth source of error, that is patients dying from acute and chronic diseases in either pregnancy, labor or the puerperium, and classed by the International Classification of Causes of Death under puerperal conditions, was quite an important source of error in the recent epidemics of influenza. Under normal conditions this error is probably almost completely neutralized by real puerperal conditions being incorrectly reported and thereby being incorrectly classified.

The record of deaths in Richmond is complete as far back as 1907. In considering the death rates from puerperal conditions for this entire period, we have used the rate per 100,000 population as being the best method available. For the more recent years we have computed the rate per 1,000 births as approaching more closely the real maternal risk-rate.

Many people do not fully appreciate the importance of the puerperal state as a cause of death. As may be seen from Table I, more

deaths were caused by the puerperal condition in Richmond during 1922 than were caused by typhoid, malaria, diphtheria, scarlet fever and measles combined.

TABLE No. I.
SHOWING COMPARISON OF PUERPERAL
CAUSES WITH OTHER CAUSES OF
OF DEATH—1922.

Cause of Death	Deaths	Death Rate Per 100,000 Population
Typhoid	8	4.5
Malaria	4	2.2
Diphtheria	16	9.0
Scarlet Fever	3	1.7
Measles	2	1.1
All Combined	33	18.5
Puerperal	34	19.1

Table No. 2 shows the deaths and the death rate per 100,000 population, white, colored and total, from puerperal causes, beginning with 1907. As may be seen from this table, the white death rate from puerperal causes has declined from an average rate of 22.2 in the five year period 1907-1911 to 17.9 for the five year period 1917-1921, while the white rate of 10.5 for 1922 is the lowest rate on record. The colored death rate from the puerperal causes has increased from 31.7 to 42.5 for the above periods. The rate for 1922 is 38.4, which is nearly four times the white rate.

TABLE No. II.
DEATHS AND DEATH RATES, WHITE, COLORED
AND TOTAL FROM PUERPERAL CAUSES,
RICHMOND, VA.

Year	Deaths			Death Rate Per 100,000 Population		
	White	Col.	Total	White	Col.	Total
Average 1907-1911	16.8	14.2	31.0	22.2	31.7	25.7
Average 1912-1916	19.2	16.0	35.2	20.1	32.7	24.4
Average 1917-1921	20.8	23.2	43.8	17.9	42.5	25.7
1922	13.0	21.0	34.0	10.5	38.4	19.1

Table No. 3 shows the death rate per 100,000 population from puerperal causes with the two principal causes, septicemia and albuminuria and convulsions, separated. As may be noted from this table, there has been a decrease in the death rate from puerperal septicemia during the last fifteen years. The death rate from albuminuria and convulsions on the other hand has remained practically the same, while the death rate from other causes has shown a slight increase.

TABLE No. III.

DEATH RATES PER 100,000 POPULATION AS CLASSIFIED BY CAUSE, 1907-1922.

Year	Puerperal Septicemia	Puerperal Albuminuria and Convulsions	Other Causes
1907	10.6	7.9	0.9
1908	13.1	10.4	8.7
1909	11.2	9.5	7.7
1910	8.6	10.1	1.6
1911	9.2	11.5	7.6
Average	10.5	9.9	5.3
1912	9.0	4.5	10.6
1913	10.3	8.8	8.1
1914	15.1	8.6	9.4
1915	6.3	5.6	6.3
1916	7.4	7.4	4.9
Average	9.6	7.0	5.8
1917	9.8	7.9	5.5
1918	7.8	8.9	11.9
1919	2.3	11.2	5.4
1920	10.4	11.6	8.1
1921	6.3	8.5	12.5
Average	7.3	9.6	8.9
1922	6.2	5.0	7.8

The following table shows the percentage of deaths in Richmond for each cause during the last sixteen years.

CAUSE	PER CENT OF ALL PUER- PERAL DEATHS
Accidents of Pregnancy -----	10.7
Puerperal Hemorrhage -----	6.3
Other accidents of Labor -----	9.1
Puerperal Septicemia -----	35.3
Puerperal Phlegmasia, Alba Dolens, Embolus and Sudden Death -----	3.1
Puerperal Albuminuria and Convulsions----	35.1
"Following Childbirth" -----	.4
	100.0

Any consideration of maternal deaths from puerperal causes at once brings up the midwife question. Dr. Julius Levy,⁹ of Newark, N. J., in a recent elaborate study, has considered the statistics of New Jersey from this standpoint. His figures would seem to show that the results obtained by midwives are much better than those obtained in hospitals and in the private practice of physicians. During the last three years every death in Richmond from puerperal causes has been investigated by one of the infant welfare nurses of the Health Bureau. All deaths in which a midwife had been in attendance were charged to the midwife. There were during this period 19 deaths among 2,813 patients attended by midwives, giving a maternal mortality of 6.7 per 1,000 births. Excluding the deaths of imported cases and the deaths following abortion, there were seven deaths among 9,069 births attended by

physicians, the maternal mortality being 7.3 per 1,000 births. The apparent slight increase in deaths of mothers attended by physicians may be attributed to several causes: First, in one case at least, a midwife was called and, upon seeing the patient's condition, refused to assume the responsibility of attending her; secondly, in all cases of convulsions physicians were called or the patients were sent to hospitals; thirdly, pregnant mothers who either have chronic impairments or have acute diseases always call physicians; fourthly, cases of pregnancy in very young girls are usually treated by physicians. The following table shows the percentage of births attended by midwives for each year beginning with 1907:

TABLE No. IV.

ATTENDANT AT BIRTH.

Year	Births Reported		Per cent. Attended	
	Physician	Midwife	Physician	Midwife
1907	1375	936	59	41
1908	1621	1185	58	42
1909	1577	1262	56	44
1910	1504	1230	55	45
1911	1701	1239	58	42
1912	1814	1255	59	41
1913	1981	1154	63	37
1914	2019	1136	64	36
1915	2290	1183	66	34
1916	2689	1213	69	31
1917	2758	1079	72	28
1918	2778	1070	72	28
1919	2845	1170	71	29
1920	3231	1147	74	26
1921	3472	909	79	21
1922	3366	757	82	18

In 1921 all midwives in Richmond were required to take a course of instruction arranged by the Health Bureau and were further required to pass an examination before the midwife examining board, before being granted a permit to practice midwifery in Richmond. As the result of this work the number of midwives was reduced from 105 to 47. As may be seen from the above table, the number of births attended by midwives has shown a very great decline in the past two years.

Coincident with the decrease in the percentage of births attended by midwives, there has been a decline in the maternal death rate from puerperal causes among the whites and an increase in the maternal death rates among the negroes. The coefficient of correlation between percentages of births attended by midwives and the colored maternal death rate is -.4. The probable error of the coefficient of correlation is 0.1416. The coefficient of correlation is just

three times the probable error and is therefore insignificant.

During the last three years there have been 134 deaths from puerperal causes in Richmond. The following table shows the summary of the deaths by color, and the maternal rate per 1,000 births for the three years. It also shows the true city rate after excluding the cases brought to the city with complications and those deaths due to abortions.

TABLE V.

MATERNAL DEATHS PER 1,000 BIRTHS, EXCLUDING DEATHS OF IMPORTED CASES AND ABORTIONS, 1920-1921-1922.

	White	Col'd	Total.
Total births reported -----	7,541	4,341	11,882
Total deaths -----	57	77	134
Excluding deaths of imported cases (9 W., 10 C.) -----	48	67	115
Excluding abortions (10 W; 15 C.) -----	38	52	90
Maternal death rate per 1,000 births.			
Total -----	7.6	17.7	11.3
Excluding imported cases -----	6.4	15.5	9.7
Also excluding abortions -----	5.2	12.0	7.6

Nineteen of these deaths were of imported cases, and only incomplete histories could be secured. The cause of death of the 115 city cases may be classified as follows:

	White	Col.	Total	Per Cent of all
Post-abortion infection -----	10	15	25	21.7
Post-partum infection -----	8	11	19	16.5
Toxemia of pregnancy (eclamp.) -----	13	14	27	23.5
Hemorrhage -----	9	7	16	13.9
Exhaustion and Shock -----	6	2	8	7.0
Other infectious diseases -----	5	7	12	10.4
Ectopic gestation -----	3	4	7	6.1
Chr. Heart disease -----	0	1	1	.9
Total -----	54	61	115	100.0

A further study was made of these deaths in an effort to find out what type of prenatal care the patient had received. We realize that this information must necessarily be incomplete, as the person who could have given definite information along this line was dead. However, the information that we could obtain gives us some idea as to what had taken place.

	Per Cent
Engaged physician before onset of labor -----	30.0
Prenatal instruction given -----	24.0
Preparations made for delivery -----	27.0
Urine examined -----	23.0

A special study was made of the births reported from that part of the city west of First and lying between Broad and Main streets. This study was undertaken for the purpose of seeing what maternal mortality may be expected among a fairly large group of mothers, all of whom would be likely to engage physicians early enough for them to be given a certain amount of prenatal care. No births were reported from this area by midwives, and all negro births were excluded. In this area all deaths of mothers who were brought to the hospitals within this area from other parts of the city or from outside the city were excluded, as were also the deaths from abortion. All deaths of mothers from this section in hospitals outside this area were charged to the area. In other words, we have made an effort in studying the statistics in this area to find out what we may expect from a physician, if given a fair chance. While this study has not been carried on long enough to arrive at any definite conclusions, the results are very striking. The following table shows the results in detail:

TABLE VI.

PUERPERAL STATISTICS FOR SELECTED AREA

Year	Births	Maternal Deaths	Maternal Death Rate Per 1,000 Births	Births Per Maternal Deaths
1920	441	1	2.3	441
1921	462	1	2.2	462
1922	429	1	2.3	429
Total	1,332	3	2.3	444

Of the three deaths from puerperal causes from this area, only one occurred in the 1920 influenza outbreak from pneumonia; one of the deaths was due to embolism and the third death was due to eclampsia and post-partum hemorrhage. In addition to the above deaths, there was one death due to sepsis following an abortion of two months, where no physician had been called.

CONCLUSIONS.

1. The white death rate from puerperal causes has been gradually reduced in the past sixteen years.

2. The colored death rate from all puerperal causes has shown a decided increase.

3. The death rate from septicemia has shown a decided decrease.

4. The death rate from toxemia has remained approximately the same.

5. In computing city mortality from puerperal causes, deaths from complicated diseases brought into the city should be eliminated.

6. In computing rates per 1,000 births, deaths following abortions should also be eliminated, as we have no means of knowing the total number of abortions.

7. The midwife in Richmond is not an important factor in the maternal death rate.

8. Nothing approaching adequate prenatal care and instruction is given to a large part of the prospective mothers in the city. Our study would indicate that there is a large field for further development in this respect.

9. The results in the section west of First street (1 death per 444 births) approach very closely to what Dublin has stated as being the ideal for obstetrics (1 death per 500 births).

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CHRONIC ULCERATIVE COLITIS AND ITS TREATMENT.*

By WALTER HUGHSON, M. D., Baltimore, Md.

Chronic conditions of an uncertain or even unknown etiology still form a considerable part of our list of diseases despite the steady advance in knowledge which has been made in recent years. Unfortunately, these same diseases are of a complex nature, respond poorly to most suggested forms of treatment, and are a constant source of embarrassment to the physician realizing, as he must, how little hope

he can offer to his patient of even an alleviation of the distressing symptoms. The very multiplicity of the therapeutic measures employed is the surest indication of the futility of most of them. How eagerly the profession grasps at each new idea that may be offered, willing, and quite properly so, to employ any measure that may promise relief to the patient. Unfortunately, many of these suggestions are based on far too inaccurate observation and in many instances represent the result of some chance benefit derived from an entirely random use of medical or surgical measures. Such a condition as I have described is chronic ulcerative colitis. From the literature on the subject one gains a confused idea of various medical and surgical procedures, vouched for by their sponsors as furnishing a beneficent if not a curative effect on the disease. The only unanimity discoverable is in the matter of the relative value of strictly medical or surgical procedures held as one would expect by medical men and surgeons respectively, but after finding agreement in the broader principle it is immediately lost in the maze of detail, varying always with the individual. In this paper no effort is made to add to the already confused state of affairs by further suggestion, but rather by an analysis of present methods and theories to reach some conclusion as to the proper manner of handling the condition. Lacking an etiologic basis, which is always the prerequisite of intelligent treatment, we can but weigh the respective merits of methods already employed and endeavor to strike an average between the various radically different modes of approach to the subject.

The disease as an entity was first recognized by White in 1888 and his paper apparently aroused considerable interest in England, judging from the amount published on the subject in the next few years. During this period and indeed until comparatively recently there persisted confusion between the colitides or dysenteries of known etiology but distinct chronicity, and this particular type to which we can assign no definite causal factor. Indeed so recently as in the 1908 edition of Osler and McCrae's *Modern Medicine* the assertion is made that "there is not as yet sufficient evidence to warrant the separation of the condition from dysentery."

A clear idea of the nature of the disease is given by Logan¹ in an admirable review of a

*Read before the York County, (Pa.) Medical Society, November 2nd, 1922.

large series of cases treated in various ways at the Mayo Clinic. He says, "Under the heading of Chronic Ulcerative Colitis I shall consider only those cases for which no definite etiology has yet been found," and Yeomans² describes his paper as being "based on sixty-five cases of chronic ulcerative colitis of unknown etiology." Those two words "unknown etiology" being used to describe the condition, necessarily limit our discussion of this particular factor, but they require a certain amount of elucidation. The point is this, a chronic colitis to which we can assign some definite cause and thereby apply a rational therapy cannot be considered in the group under discussion. We can accept as belonging to this group only those cases in which none of the usual, or for that matter, unusual causes of chronic ulcerations of the colon can be assigned. This point cannot be emphasized too strongly. Much of the confusion existing in the matter of treatment is due to the fact that in discussion of papers, methods used successfully in the treatment of the ordinary bacillary dysenteries and colon infections are represented as being curative for this variety of unknown origin. Probably the most likely factor in its causation is some previous intestinal infection, either bacillary or of the parasitic variety, which perhaps leaves the intestines in a condition of lowered resistance. Thus Logan describes cases following ptomaine poisoning but with no significant bacteriology; he also suggests hyperacidity of the intestinal contents by citing relief of symptoms following alkali therapy. In Yeomans' series a majority occurred in the first three decades—this was also true of Logan's cases—and he mentions dietary and other youthful indiscretions as being a possible cause. Several writers have mentioned a previous history of amoebic dysentery but with no amoebae or cysts present at the time of examination. Yeomans gives a list of conditions preceding the actual disease in his series but concludes that these various factors—infections, operations, pregnancies, etc.—can only have played a part in that they lowered the individual's general resistance. The disease is not transmissible. Examination of the intestinal flora seldom shows anything more than the usual types of organism. Kendall feels that "Normal intestinal organisms, or types indistinguishable from them by ordinary methods of study, may multiply with abnormal luxuri-

ance through unusual conditions; extend their normal habitat and crowd out some of the existing organisms, eventually leading to abnormal reactions in the alimentary canal which may be detrimental to the host." The possibility of some anaerobic organism being responsible for the disease has been frequently considered. The tubercle bacillus cannot be found in the stool. Yeomans found a positive Wassermann in only 3 of 58 cases examined in this way and very properly concluded that syphilis could not be regarded as an etiologic factor.

The gross and microscopic pathology is little more helpful. The picture depends entirely on the extent and duration of the disease. Yeomans gives an excellent pathological classification of the superficial changes in the mucosa. Primarily there is present a simple chronic inflammatory process, characterized by different types of ulcers in various stages of development. These ulcerations as seen through the sigmoidoscope range from the superficial discrete variety to those with a deep hemorrhagic or necrotic base. Perforations occasionally occur through this latter type. The mucosa may be uniformly thickened or thrown into the form of polypoid tumors; this latter condition has been mentioned as a complication. The submucosa and muscular coats may be thickened or thinned and, though the intestinal mucous membrane is fortunately prone to repair, the new formed connective tissue may undergo slight or marked cicatricial contraction. Under these conditions stricture may develop. Logan lays considerable emphasis on this scarring and consequent smoothing out of the mucosa. It has been generally believed that the ulcerations are present in greater numbers along the taenia coli, but Logan states that this was present in only four of his reported series of 117 cases. The rectum and sigmoid are most frequently affected though the caecum is often found to be definitely involved, suggesting the greater susceptibility of the fecal reservoirs. The entire colon in late cases shows ulceration and, when the disease has progressed very far, the entire large bowel may be simply a long, ulcerated pus discharging tube.

As might be expected, there is present microscopically a general round cell infiltration of the mucosa; the glandular epithelium is frequently destroyed and the glands themselves filled with leukocytes. Numerous chronic

ulcers of the mucosa are seen which, as stated above, after extending through the entire bowel wall may lead to perforation. These ulcers present no peculiar characteristics.

However obscure may be the etiology, certainly the disease presents symptoms which when combined with adequate laboratory examination will leave little doubt in the physician's mind as to its true nature. The outset is invariably marked by a diarrhoea. Logan and Yeomans both analyze their cases from the standpoint of symptoms presented. The stools may range in number from three to twenty in 24 hours. The character of the stool varies from time to time but in general is watery and contains varying amounts of blood and mucus. Blood is almost constantly present and the patients soon develop a secondary anaemia. There is sometimes an eosinophilia (these cells may occasionally be found in the bowel wall). Yeomans found an average loss of weight of about 20 lbs. Occasional cramp-like pains are felt, burning pains in the abdomen, indeed all the signs of inflammation. Abdominal rigidity is not a marked symptom. The disease is a distinctly chronic one, prone to remissions sometimes seasonal in character, and extremely likely to recur—a fact which should be borne in mind when analyzing the results of different treatments. In Yeomans' series again the average duration was two years and two months and these figures indicated the period the disease had existed before coming under his observation. In Logan's series only 18 had had symptoms for less than one year and only thirty under two years. Fever is a late manifestation. Up to a certain point the patients manage to maintain their usual activities in life, but unless given relief there develops a progressive weakness and prostration.

The diagnosis is readily made when all other conditions have been ruled out and, as I have indicated above, this process of elimination requires facilities which unfortunately are not always at hand. The bacteriology of the gastro-intestinal tract presents difficulties and problems of a very special nature. The methods and equipment for isolation and identification of the intestinal flora can be found only in especially equipped laboratories under the direction of trained bacteriologists. The history may be typical. The following case will illustrate it:

The patient, an undernourished, anaemic young man, 19 years of age, came under observation after suffering from a colitis for four years. The trouble had started with what seemed to be a mild dysentery which failed to clear up in the usual time; diarrhoea persisted in a moderately severe form for several months when mucus appeared in the stools in considerable quantity and soon after blood was found. Therapeutic measures were adopted which proved beneficial for about six months when the trouble returned as severely as before. Ten stools a day with abdominal pain and rectal tenesmus were the principal features. Medical treatment again brought about some relief for nearly a year when there was a second recurrence which persisted until the patient came under our observation. At this time there were about 15 stools a day with large quantities of blood and mucus. He presented all the characteristic clinical and laboratory findings of chronic ulcerative colitis.

The outset may be associated with some definite disease attack or there may be elicited some clear cut story of dietary trauma or privation.

Laboratory studies invariably fail to show any of the usual parasitic or bacterial invaders in the feces. This part of the diagnosis must be thorough and exhaustive as it is only after elimination of every known cause that we are justified in placing the case in the class under discussion. Syphilis must be ruled out by careful blood examination and tuberculosis by examination of the lungs and intestinal flora. In the opinion of both Logan and Yeomans, direct inspection of the rectum and sigmoid are of the greatest aid in diagnosis. If the case is seen early the upward invasion from the recto-sigmoid junction can be followed—a fairly typical occurrence—and the general appearance and growth of the ulcerations observed. Benign and malignant tumors, strictures, etc., can also be ruled out in this way. These two authors are also agreed on the value of X-ray examination. The extent of the process can be seen when the transverse and ascending colon are involved, a point which the sigmoidoscope fails of course to show. Early there appears the typical picture of an irritative condition with increased peristalsis. But with the advance of mucosal involvement and the resultant thickening and fibrous tissue formation, peristalsis becomes

much impaired. The waves are flattened out, as it were, and "the colon becomes a stiff walled tube without haustrations." (Logan). Stricture may follow. Yeomans states that in none of the sixteen cases examined by X-ray "were upper segments of the colon demonstrated to be implicated without the descending colon and sigmoid." The disease is primary in the rectum and sigmoid.

Logan summarizes the diagnosis as follows: (1) The history of an intractable diarrhoea which in the large majority of cases contains blood, pus and mucus; (2) by not finding any parasitic or known bacterial cause in the stool; (3) by the proctoscope showing involvement in the rectum and lower sigmoid, or (4) by the X-ray showing the characteristic changes in the colon.

Obviously the prognosis must be a guarded one. As we shall see presently in the discussion of treatment no single therapeutic measure has been of value in all hands. When apparently cured, the disease is prone to recur and not infrequently the individual fails to respond to any measure adopted whether medical or surgical. Complete cures are very much the exception. Alleviation of severe symptoms and control of any further extension should constitute our preliminary prognosis. Even this may be too sanguine. The subject of treatment is a vast one. Special therapeutic measures have been suggested, tried, and reported with extraordinary regularity. Surgeons and medical men have been equally prolific in their suggestions and in many instances have combined each other's ideas, thereby offering an appalling number of possible methods of treatment.

Treatment of diseases of the alimentary tract is a difficult problem. Unlike similar conditions on the surface of the body, which we can deal with more or less in an individual way, our attention, in organic disturbances of the digestive apparatus, must be divided between the local condition and the elaborate physiological mechanism of the structures involved. This point is often lost sight of. No where, not even excepting the urinary apparatus, is treatment made so difficult by functional activity as in the intestinal tract. While dealing with the lesion our therapy is constantly interfered with by the passage of irritating fecal material over the raw and bleeding surface of the ulcers. Little wonder is it that

these conditions become chronic. A similar problem is met effectually in the case of ulceration of the stomach and duodenum by the almost universally used gastro-enterostomy which in the last analysis is simply a mechanical side-tracking of the the stomach content. It has been everyone's experience that large indurated ulcers of the stomach fairly fade away after the irritating action of food mixed with gastric juice has been removed. Local applications here would hardly be considered. Furthermore, unless we have the benefit of some specific drug, such as emetin, how useless must most of our attempts be to sterilize that part of the tract where bacterial and parasitic growth is so luxuriant. How difficult we frequently find sterilization of the male urethra whose comparatively simple mucous membrane and glands offer few of the difficulties of approach found in the elaborate rugae and secretory apparatus of the large and small bowel.

As in every problem connected with the gastro-intestinal tract, there are two distinct forms of therapy, medical and surgical. Zealous proponents of one or the other tend to be intolerant of any but their favorite measure.

The basis of all the medical therapy of chronic ulcerative colitis is irrigation with antiseptic or healing solutions. Medication by mouth would hardly be considered as a possibility, though of course diet in that it changes either the consistency or reaction of the fecal material may be of benefit. Rectal and colonic irrigations have long been employed as therapeutic measures—instillations of solutions of the silver salts, AgNO_3 , arygyrol and protargol in mild cases which have not extended any great distance upward seem to have been of some benefit; so too, the use of a bland, non-irritating oil which so lubricates the bowel wall that the irritative action of the fecal material is partially allayed. This oil should be retained over night if possible. Other irrigations used are solutions of the common salts, sodium chloride, sodium bicarbonate, boracic acid solution, potassium permanganate, hydrogen peroxide (I have seen such an irrigation cause perforation of the bowel where a large ulceration was present) quinin and chloramin-T. The irrigations should be given in the knee chest position with the proper precaution observed against over distending the

bowel. Yeomans considers peroxide in two per cent. solution the best; Logan prefers argyrol but said the best results were obtained from enemata of hot water 120° F. In one case he secured healing with complete disappearance of symptoms after four months of such treatment. Bassler³ feels that "enemata are not apt to be helpful and are often harmful" and states, "If the bowel cannot be irrigated from above, such as by the duodenal tube, the intestinal tube of Einhorn or by operation, it had best not be irrigated at all." Direct local treatment of individual ulcers through a sigmoidoscope is another method which is of course distinctly self-limited.

Oral medication may be said to begin with diet which in general should be such as to eliminate all irritating and highly fermentative articles and those which have any rough residue. Bassler gives this subject of diet considerable attention. He advocates a high protein diet of the usual meats, fish, eggs, green vegetables, butter, milk, cream cheese, gelatin foods, etc. And despite the diarrhoeic condition, he has cured a few cases by the simple use of an anti-constipation diet of bran t. i. d. in various forms, stewed prunes, heavy molasses, petroleum, vaseline, senna leaves and a liberal amount of water. Oil by mouth in addition to being a good tissue builder serves much the same purpose as a rectal irrigation. Bassler has had good results from the use of gentian violet in enteric coated pills each containing 0.016 gm. This procedure is based on the selective bactericidal action of gentian violet. Churchman⁴ considers that the dye has a bacteriostatic action on the organisms, that is the dye suspends reproduction without implying that the organisms are necessarily killed. Spores are also affected by the dye. Many of the intestinal flora are susceptible.

An interesting procedure is that which has been used successfully by Einhorn⁵ in two cases of ulcerative colitis. I speak of the Einhorn intestinal tube by which true colonic irrigations can be given without the aid of surgery. The time consumed in passage of the tube is one week—for withdrawal three days. The treatment lasted for 46 days—several types of irrigations were used the most efficacious being calcium carbonate and water 0.5:1000 c.c. with 15 gtts. of ichthyol in the latter part of the drip. He also used mercurchrome one per cent. solution zii q.d. for one week. The patient gained 23 lbs. and was considered

cured. Bassler prefers irrigation through a simple duodenal tube. Autogenous vaccines have been used with success by Yeomans but Bassler found little to recommend them and Logan feels the same way. Intravenous therapy has been used. A negative Wassermann is, of course, not necessarily final and when other stigmata of syphilis are present salvarsan should be tried. Dr. Thomas R. Boggs, of Baltimore, tells me that in some of the intractable cases at the City Hospital he has used intravenous injections of 10 c.c. of a ten per cent. solution of calcium chloride with quite remarkable results. The bleeding is arrested almost immediately and subsequent healing takes place in over fifty per cent. of the cases. This is an interesting lead and one which deserves considerable attention and further trial.

It is more or less agreed that after a thorough trial of any or all of the above procedures and that after they have failed to give permanent relief resort should be made to surgery. Bassler, however, is not in complete accord with this general statement. He says, "The necessity of irrigation for months makes the Einhorn tube impractical. However, the duodenal tube method should supplant the operation for irrigations, especially since many of those treated by operation are improved only as long as irrigations are kept up and when the fistula is closed the re-performance of operation for the original purpose is not fair to the patient, especially when the results by duodenal or intestinal tube are every bit as efficient and can easily be resumed at any time."

Surgical methods employed are appendicostomy, first suggested by Wier; cecostomy; iliostomy; Brown iliostomy and appendicostomy; iliocecostomy; resection of sigmoid and colectomy. From the first three there is little to choose, the technique of the operation is simple, the object gained from each one practically the same. Any one of these openings simply furnishes a direct means of irrigating the affected portion of the bowel with the various healing solutions, but the procedure has no effect whatever on the downward passage of fecal material other than to hasten its discharge. The usual solutions prove efficacious,—potassium permanganate 1-10,000 increasing up to 1-5000, tannic acid 1 dram to the quart, plain water and salt solution either iso- or hypertonic all have a good effect. The

stools promptly decrease in number, their character is changed and the patient finds great relief. Little discomfort is experienced from the opening and the patient soon learns how to take care of himself. There is but slight discharge and, when the proper time arrives, healing is usually spontaneous. If occasion demands, the bowel can be reopened with very little difficulty and simply by the use of a local anaesthetic. This operation cannot in any way be considered a difficult or dangerous one and hardly seems to warrant Bassler's opinion of it. Frequently the bowel or appendix following closure will be found immediately beneath the skin when occasion for reopening it arises. Immediate relief of symptoms sometimes follows opening of the bowel. This suggests that the simple introduction of oxygen into the diseased colon may have a beneficent effect and, in conjunction with the theory that the causative organism might be an anaerobe, I have injected oxygen through the appendicostomy opening allowing it to bubble through very slowly and to remain in the bowel as long as possible. No cures were effected but there was marked relief in two of three cases after other irrigations had failed. In one the relief has been, so far as I know, permanent; in the second case there was a recurrence, and in the third no relief whatever was experienced.

Going a step further, and I think in the right direction, is the procedure first described and advocated by Brown, of St. Louis. Payne,⁶ in an article entitled "Physiological Rest to the Large Bowel by Surgical Intervention," takes the matter up in detail. The operation consists in making a complete severance between the ilium and cecum. The stump of the ilium is brought out through the flank and the cecum is fixed to the abdominal wall and a cecostomy made. Thus the colon is entirely relieved of the necessity of functional activity and in addition to being given a complete rest can be treated exactly as in the other types of operation. Payne says the discharge from the small intestine is not particularly irritating to the skin and interestingly enough that in time the discharge becomes semi-solid. This may possibly be a somewhat too optimistic view to hold in regard to ilioostomy as the discharge is undoubtedly irritating and certainly retains its fluid character for many weeks. After a rest period of 90 days, or however long a time is necessary to complete the heal-

ing, the ends of the bowel are sutured and the cecostomy opening closed if necessary. Payne has had excellent results in several cases. Iliocolostomy is an operation of some difficulty and at best relieves that portion of the colon which is usually the least severely involved.

Colectomy and resection of the sigmoid are emergency measures and should only be undertaken when all hope of relieving the ulcerated condition of the bowel has been given up. This point is reached only when the colon has undergone such marked structural change that it is simply a pus forming tube. Naturally, any such condition greatly increases the gravity of an operation which at best has a forbiddingly high mortality.

General hygienic measures must be adopted whether the patient be medical or surgical. A careful life, rest, sleep and fresh air will prove of benefit in this as in any other disease.

Statistics of improvements, cures and failures by the different methods advocated are of very doubtful value as there have been so far no consistently brilliant results from any one form of treatment. Yeomans, using only appendicostomy, cured approximately the same percentage of his surgical cases as those which he treated medically and constitutionally. He had one death in nine surgical cases. Logan using all types of operations claims no cures for surgery but reports many with marked improvement. His immediate surgical mortality was 11.8 per cent. but the variety of operations used was great and he had several colectomies. In his list Logan had seven cures in 38 patients treated medically, not by any means a brilliant showing but quite as good as any other reported series.

From this great amount of material we cannot help but feel the probable futility of much of it. However, lacking anything better we must make the best use possible of the means at hand. Whatever unanimity of opinion there is in regard to possible benefit from the various measures suggested would seem to justify our selecting as most valuable the following: Rectal and colonic irrigation except in very early cases can hardly be a method of any great value but should be made use of if the case can be diagnosed promptly. It represents the only means of treatment at hand for the general practitioner and for this reason can certainly not be ignored. Diet as prescribed by Bassler and whatever oral medication seems appropriate should be given a thorough

trial. The Einhorn tube, were it not for the natural hesitation one would feel in using it, is the soundest of the non-surgical procedures. It is difficult to see the value of the duodenal irrigation as advocated by Bassler which in regard to the colon can amount to but little more than irrigation of the large bowel with dilute small intestine contents. Drinking considerable quantities of salt solution or whatever the irrigating fluid might be would probably answer the same purpose. Autogenous vaccines should be tried as their administration is easy, they cause no discomfort to the patient and have been reported as giving beneficial results in some cases. Intravenous therapy wherever indicated should be adopted, particularly calcium chloride.

Of the surgical procedures, the Brown operation is undoubtedly the soundest from a physiological standpoint. Many patients would probably be much opposed to a fecal fistula even though assured of its ultimate closure and under such circumstances an appendicostomy or cecostomy would be the second choice. Colectomy would be justified under the rarest circumstances.

In conclusion we can say that:

(1) Since chronic ulcerative colitis is a disease of unknown etiology, its therapy cannot be definitely established beyond each individual case.

(2) Medical treatment should be instituted immediately the diagnosis is made; and should be continued only so long as the patient is deriving from it actual benefit.

(3) Physiological rest of the ulcerated bowel should be the aim of any surgical procedure adopted; and the more complete the rest obtained the better the possibility of a cure.

(4) If this is impossible the colon should be irrigated from above downwards through an opening in the appendix, caecum or terminal ilium. There is no peculiar virtue in any particular irrigating fluid.

(5) Due to the recurrent character of the disease, a case can be regarded as cured only after complete relief of symptoms for at least a period of one year.

(6) The prognosis should be an extremely guarded one.

1411 *Eutaw Place*.

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A CONSIDERATION OF SYMPTOMS AND HISTORY IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS.*

By DEAN B. COLE, M. D. Richmond, Va.

With a realization of the need of an accurate history in the diagnosis of pulmonary tuberculosis, and an appreciation of the needs of the busy practitioner, we will briefly consider the symptoms of pulmonary tuberculosis.

LOCALIZING SYMPTOMS.

1. **COUGH** is frequently the earliest symptom of pulmonary tuberculosis and almost always occurs at some stage of the disease. Any cough lasting more than three weeks should be looked on with suspicion.

2. **EXPECTORATION**—As a rule expectoration is closely associated with cough but may occur independently, the sputum being raised by hawking or clearing of the throat. In the early stages of tuberculosis the sputum is usually slight in amount and is frequently raised only early in the morning.

3. **HEMOPTYSIS**—Any hemorrhage of a dram or more should be attributed to pulmonary tuberculosis until proven otherwise. A tentative diagnosis will do no harm and may be the salvation of the patient. From 80 to 90 per cent of pulmonary hemorrhages are caused by tuberculosis and most of the remainder by bronchiectasis, lung abscess, malignant diseases of the lungs, and various mycotic infections, all of which will be benefited by a tuberculosis regimen until definite diagnosis is made.

4. **PAINS**—Most tuberculous patients suffer from chest pains, either pleuritic or toxic, or both. Pleurisy is always a suspicious symptom and, if an effusion be present, the cause is almost always tuberculosis.

*One of a series of lectures and demonstrations to a class of physicians in tuberculosis held under auspices of the Health Bureau, Department of Public Welfare, Richmond, Va., February 15, to April 15, 1923.

5. **HOARSENESS**—This is frequently the first intimation of the presence of pulmonary tuberculosis and may occur for years before other symptoms become manifest. It is most likely to be transient rather than persistent, and frequently is only present after prolonged use of the voice. A laryngological examination is important in these cases.

6. **DYSPNEA**—Shortness of breath is a common symptom among those suffering from pulmonary tuberculosis, and is sometimes the first symptom noticed by the patient. There are many factors that may cause this symptom, and for that reason dyspnea bears little relation to the amount of pulmonary involvement.

CONSTITUTIONAL SYMPTOMS.

1. **FEVER**—An afternoon rise in temperature of one to two degrees or even less should lead one to suspect tuberculosis as the cause. As a rule, rest in bed will cause a lowering or disappearance of fever, in the tuberculous, while exercise produces an elevation. However, temperature of pulmonary tuberculosis may resemble that of pneumonia, malaria, or even typhoid fever, depending on the stage of the disease, resistance of patient, complications, etc. To be of most value in diagnosis, readings should be taken at two hour intervals over a period of at least three days. Remember a normal or even temperature does not rule out tuberculosis.

2. **LOSS OF WEIGHT**—A gradual and progressive loss of weight is characteristic of tuberculosis.

3. **INTESTINAL SYMPTOMS**—Loss of appetite, indigestion, and epigastric fullness usually accompany loss of weight, but all or any may be independent of the others. Either constipation or diarrhea may be present. These symptoms may be present for months before others are complained of.

4. **ACCELERATION OF PULSE** may be the first symptom of tuberculosis. In these cases the differentiation between tuberculosis and thyroid disturbances is most difficult.

5. **NERVOUSNESS** is a most frequent symptom of pulmonary tuberculosis, and only too often is tuberculosis overlooked as the causative factor. Many so called nervous breakdowns are in reality manifest tuberculosis.

6. **SUPPRESSION OF THE MENSES** may be the

first tangible symptom of an oncoming tuberculosis.

HISTORY TAKING.

The following facts should be obtained as far as possible, it matters not whether you are taking an elaborate history or simply questioning your patient either before or after examining him.

1. **COMPLAINTS**—Ask patient why he came to the office. Without asking leading questions, see if the patient complains of any of the following: cough, expectoration, hemoptysis, loss of strength, pleurisy, indigestion, etc.

2. **FAMILY HISTORY**—Question patient closely as to whether or not there has been a death in the immediate family, and, if so, was the cause tuberculosis. Do not simply take the patient's word for cause of death, but question him regarding symptoms, cause of disease, etc., so as to be, as far as possible, sure in your own mind that it was not tuberculosis. Family history of this disease probably is not a great factor except in the immediate family of the patient, unless he has closely associated with some distant relative who had tuberculosis. Of course, in that case, it is a question of association and not family relationship.

3. **PAST HISTORY**—General health; work; when patient began work; type of work; environment; amount of rest patient gets; home conditions; whether or not married; children—how many; past diseases—measles, pertussis, typhoid—these are unquestionably the three most important: measles, due to the fact that it so frequently leaves lung complications; whooping cough, for somewhat the same reason; typhoid has no particular bearing on tuberculosis except that frequently the diagnosis of typhoid is made when the patient was simply suffering from tuberculosis, and a period of weeks in bed was sufficient for the patient to temporarily recover. On the other hand, occasionally a case of typhoid is diagnosed tuberculosis. General questions on the circulatory system—as palpitation of the heart, dyspnea; on gastro-intestinal system—as to appetite, bowels, etc., should always be asked, and any suggestive symptoms should be closely followed up. Of course, questions on the nervous system and the genito-urinary system should not be overlooked, even in a patient known to be suffering from tuberculosis any more than in any other patient.

HABITS—The habits of the patient are most important and are frequently overlooked. Questions relating to the use of alcohol, drugs, and excesses of all kinds should be asked.

EXPOSURE TO TUBERCULOSIS—Has there been any intimate exposure? If so, when, and for how long?

PRESENT ILLNESS—Here we are trying to determine the onset of the disease. When were you last perfectly well; the illness began how and when; acute or gradual? Try to ascertain if illness began with any of the following: cold, gripe, pleurisy, hemoptysis, fever, or simply with fatigue and loss of strength. This is determined in order that we may classify onset of disease under one of the following: *Insidious*—in which the patient complains of fatigue, lack of endurance, as probably the earliest symptoms, and gradually develops other symptoms over a period of months, or perhaps a year or more. *Catarrhal*—here the usual onset is a cold, so-called bronchitis which, in reality, is simply tuberculosis manifesting itself in this way. *Hemoptotic*—here we have frank hemorrhage manifesting itself as the first symptom. In many cases, of course, patient had symptoms but never realized it until after he had had his hemorrhage. *Pleuritic*—here the onset is with pleurisy and frequently pleurisy with effusion, sometimes following pneumonia. *Febrile*—This type is less frequent, and not infrequently the patient comes to the doctor suffering from some condition other than tuberculosis and the physician discovers that the patient has been running a temperature that he cannot account for, and this leads to a diagnosis of tuberculosis. Of course, there are many other ways in which temperatures are discovered, and in an effort to discover the cause the diagnosis of tuberculosis is made.

"It is no exaggeration to state that from the history alone the vast majority of cases of early tuberculosis can be recognized definitely, or at least the presence of the disease can be strongly suspected."*

*Quotation from Norris and Landis book on Diseases of the Chest and the Principles of Diagnosis.

2609 Hanover Avenue.

DIET IN TUBERCULOSIS.

By H. R. EDWARDS, M. D., Richmond, Va.

Clinician, Bureau of Tuberculosis Education, State Board of Health.

If there is one thing in particular that has

been neglected in the treatment of diseases, it is diet. Tuberculosis is no exception to this rule; in fact, we might even say that the diet for tuberculous patients has not only been neglected but abused as well. This abuse, which was intended to accomplish much good, was the result of an accepted theory regarding its treatment. In consumption there is a great wasting away of tissue and, because of this fact, it was thought that a heavy diet, consisting usually of excessive amounts of protein, would correct this condition by replacing the lost tissue. Our ideas, however, have changed quite materially in the therapy and diet of tuberculosis and rest is now considered the first essential in its treatment. With this thought in mind, I shall try to show how the best results may be obtained by a properly regulated diet.

Diet, for the normal man as well as for those suffering from disease, has been given very little attention in the past and we have only to look about us to see the results of such carelessness. The digestive apparatus of the average American has some impairment or definite loss of function. Rheumatism, arteriosclerosis and many other diseases are traceable to a faulty diet. There is no land on the globe that has the great variety of food that we have from which to select and none could have a more perfect diet. The lack of interest, almost utter indifference to the whole subject, seems to arise from the very fact that our food resources are so abundant. Also, many of the foods that we do use are spoiled in preparation, to say nothing of the vital elements that are wasted by boiling and discarding the juices.

It was found at the Phipps Institute in Philadelphia, that 80% of tuberculous patients showed some impairment of kidney function. A less percentage showed definite tuberculous involvement. We know that the kidneys are one of the most important excretory organs of the body and any impairment of their function is sure to have an effect on the elimination of poisons that are so numerous in tuberculosis. The unusually high protein diet, generally used in the treatment of this disease, is a direct tax on the excretory organs and also has a definite relation to the metabolic rate, of which I will speak later. The liver is another vital organ for the excretion of waste products and we find it also very often impaired in function.

I am sure that you are all aware of the experiments with low protein diets that were made some years ago by Chittenden of the Yale Scientific School. He selected several professors, college athletes and a group of soldiers, loaned by the Government for this purpose. From the experiments, which were conducted over a period of several months, he found that less than half the accepted amount of protein is sufficient to keep the body in vigorous activity and good health. Such experiments have been repeated many times since and the accuracy of Chittenden's findings, proven beyond a doubt. We only need to observe the Chinese coolie to understand that high protein is not essential to endurance. Those men run for hours throughout the day with their rickshaw loads and never tire. The same is true of the natives of India. They run for miles without ever tiring and their diet is essentially a very low protein one. The Japanese soldiers out-marched any others during the Russo-Japanese War and their diet is noticeably low in protein, meat being eaten only occasionally.

Dr. R. A. Kocher reported in the *California State Journal of Medicine* some metabolism studies that he had made on pulmonary tuberculosis at Trudeau Sanatorium, Saranac Lake, New York. In brief, his conclusions were as follows: In fifteen cases of afebrile pulmonary tuberculosis, eight of which showed active lesions, the metabolism was basal, that is, within a few per cent above or below the average normal. On two patients the effect of giving a meal of 400 grams of lean beef was determined.

The metabolism was raised 25 to 30 per cent, due to the so-called specific dynamic action of the protein. The effect of a high caloric diet on the rate and depth of respiration was determined. A mixed meal of one thousand calories increased the ventilation of the lungs, measured as minute volume, 18 to 20 per cent. These facts prove that a high caloric or a high protein diet have the same effect as muscular work on the patient and, as rest is the chief factor in the treatment of tuberculosis, we defeat our purpose when we feed excessive amounts of protein, thus greatly overtaxing the lungs; the very organs that we are most anxious to have at rest. Janney and Newell have shown that cases of pulmonary tuberculosis complicated by diabetes, or *vice versa*, are favorably influenced by the state of under-

nutrition resulting from a rigid adherence to the proper diabetic diet.

To quote further from the experiments of Kocher at Trudeau, with relation to the creatinin co-efficient, we find that four subjects were selected and the creatinin co-efficient was studied, first on a low, then later on a high protein diet, over an extended period; starting from early convalescence, when the patients had just completed the bed rest, through a period of moderate exercise. At the time muscular activity began, the creatinin co-efficient was uniformly low. With the increase in weight, the co-efficient was practically stationary or even decreased on a low protein diet, where there was a substantial gain in weight. It is plainly evident that the gain in weight was a gain in adipose and not in muscular tissue. During the period on a high protein diet, when the patients were on moderate exercise, there was a very decided rise in creatinin co-efficient in every case. This showed that there had been a nitrogen retention and synthesis of new protein, or active functioning in muscular tissue. We have then, in creatinin estimation, a simple means of determining, at any time, whether a patient is making a substantial, or only a spurious gain. The creatinin output is the index of the functional efficiency of the body. We learn from these facts that superfluous fat merely adds to the metabolic rate and respiratory rate without adding to the functional efficiency of the organism.

Uhlom claims that passive congestion of the liver is found in nearly every case of tuberculosis. This, of course, is a result of diminished respiratory function which, he says, is brought about by the fact that the venous circulation of the liver is influenced largely by the movements of the diaphragm and he claims that it is possible to have this movement diminished and yet have more rapid respirations.

Dr. Lawrason Brown warns against high protein diets, claiming that they do not lead to permanent results and success and are likely to give rise to toxic action of the liver and kidneys. Again, he has shown that a diminished alkalinity of the blood stream does not favor the healing process and this condition is brought about by using high protein dietaries, especially those with an excess of meats.

Degeneration of the thyroid gland, concurrent kidney diseases, disease of the adrenals, all show some relation to the tuberculous pro-

cess and the foods ingested. We should understand then, that the diet in tuberculosis should be given careful thought and attention and, if we wish to save the body as much energy as is possible and facilitate the healing process, we must use every precaution to eliminate anything that will tax the system unnecessarily. Care should be given to the teeth as it has been found that many of the cases that have been starved of lime for long periods are those that have very poor teeth; consequently, the powers of mastication are impaired, resulting in poor digestion. The digestion of proteins is mostly in the stomach and the action of the ferments found there is greatly enhanced by the presence of some alkali like that which is found in the saliva.

Attention should be given to the intestinal tract. The intestinal flora is of such a character that putrefaction is inevitable if this organ of elimination is neglected. It is not necessary to go into detail to prove how injurious such neglect may be to the entire system. Buttermilk prepared with *B. Acidophilus* will help greatly to correct any condition of the intestinal flora that may result from such carelessness. This will also often relieve much of the constipation that exists in this disease which is, of course, a direct menace to the progress of the case.

Now that we know what may be expected of the ordinary case of pulmonary tuberculosis (which may be summarized generally as impaired organs for the elimination of waste products, caused by the foods ingested) we should understand that the course which should be followed in diet is to use only the minimum amount of food and especially a restricted protein dietary. The diet of our sanatoria throughout the country is all, more or less, at fault in this respect; though many are showing some progress by discontinuing the usual nourishment between meals. Most patients are firmly convinced that they must eat large portions of meats, eggs, and milk in order to get well. This is not true but it will require much time and education to change such erroneous ideas. Many of them do not feel that they are making any progress unless they are gaining a considerable amount in weight. It is well, of course, to gain a certain amount but excessive weight is burdensome besides being a hindrance to the success of the cure. It is far better to gain slowly, at the same time gain-

ing strength, than to gain large amounts of adipose tissue and no strength. An effort should be made to gain from about five to ten pounds in excess of a patient's usual weight, not the estimated weight for height and age. Always remember that high caloric value of foods increases the metabolic rate, consequently increasing the respiratory rate with a lessened amount of rest to the diseased lung, the very thing about which we are most concerned.

Too much care cannot be given to the amount of protein used in the diet for tuberculosis. It should be rich in fats and carbohydrates, vitamins, iron and lime, a minimum amount of protein with sufficient bulk to insure two bowel movements a day. During the active stages of the disease, when there is a great body loss, more protein should be fed than later when the disease is arrested, but this should never be in excessive amounts as is now practiced so freely. If it were possible to obtain and prepare the protein for this purpose without using meats, we would make another great advance in this most important branch of tuberculosis therapy.

Some of the advantages of a vegetable, over a flesh protein dietary are as follows: vegetables do not readily undergo putrefaction and decomposition. Flesh proteins contain a great amount of toxin that is present from the usual metabolism going on in the body of the animal at the time it is butchered and putrefactive, as well as other organisms are allowed to grow to enormous amounts. These affect the intestinal flora and favor autointoxication. However, at this time, it is not possible to change from one to the other in the ordinary home or many of our sanatoria because they are not prepared to offer proper substitutes: not that we lack such materials but the majority of people are not educated in their use and selection. It is needless to say that whatever protein we do use should be in as small amounts as possible. An increased amount, as is customary, involves grave dangers to the patient by decreasing his vital resistance and imposing unnecessary burdens on the excretory organs which are already overtaxed and often seriously crippled. Men who have been associated with this work for many years have given us definite evidence that patients receiving high protein diets do not make the best progress. The additional toxins that result from excessive amounts of protein, together with those of the

tubercle bacillus, materially handicap the healing ability of the blood stream by reducing the alkalinity of this fluid.

We shall now consider, more in detail, some of the various food principles that are necessary to the normal organism as well as to the diseased one. As a rule, only a slight change in the amounts is necessary to adapt them to all conditions.

During the stage when the patient is having active symptoms, the diet should be of a different character than when the case is quiescent and the patient is exercising. Three meals a day are usually quite sufficient but, if the digestion is impaired greatly, it will be found necessary to feed oftener. Foods requiring little effort on the part of the body to assimilate them are the most advisable. While in the arrested stages, the diet may be largely that of the normal person, the meals should have as much variety as possible and should be spaced about five hours apart. If the patient is forbidden food between meals, his appetite will be more acute at the regular meal time and he will doubtless eat more than he otherwise would. From observation, I have found it most interesting to note that very often the case that complains of a loss of appetite is one that is gaining steadily; making it very evident that, previous to that time, he or she had been eating too much. This has been a great help in preaching the principle of a low protein diet, because the patient unconsciously proves to himself the disadvantages of over-eating.

McCann and Barr, of the Russell Sage Foundation at Bellevue Hospital Medical College of New York, have shown in their metabolism studies of pulmonary tuberculosis that the amount of food required by the consumptive need not be more than 20 to 25 per cent above that which is required for a normal person, about 500 calories above that required when at rest.

Much of the natural salts, as iron and lime, are lost in our modern methods of cooking. This is largely due to boiling vegetables and throwing away the water which has absorbed a large proportion of these most vital elements. We know that in the healing process of the most favorable cases much calcium is deposited in the tubercles. The usual diet for ordinary needs is, as a rule, low in calcium and this is greatly decreased when an extra amount is re-

quired for deposition in the tubercles. Milk which contains much lime and should be used freely, together with greens, buttermilk, whole wheat breads, cottage cheese and soy beans, contain 99% of the day's supply of calcium. Meats, as a whole, are deficient in this salt element.

In a man weighing 150 lbs., we find 1 oz. of iron and there is a loss of about 1/7 of a grain of iron each day in the usual functioning of the body. As we know, this important element is needed to make hemoglobin, without which bodily activity could not continue. It is not possible to take this iron into the system in the form of inorganic iron and it has been found that the usual medicaments containing such iron are not as easily assimilated as they were thought to have been, so the chief amount of this iron must be supplied by foods and taken into the system through organic action. In tuberculosis, where there is lessened space in the lungs for the exchange of gases, it is most important to have the highest number of red cells possible to facilitate the combination of CO₂ with oxygen. Natural food stuffs contain this iron in the best form and the one that can be absorbed easiest. When we consider the amount of iron, or percentage of the day's ration, contained in one ounce of material, we find that the legumes (averaging 11.35) produce more than we get from any other source. Greens contain 4.29, cereals 3.9, nuts 3.49, eggs 5.67, fruits 1.74, vegetables 1.46, milk products 1.05, and milk .47, or less than half of one per cent of the daily requirement. Considering the per cent of iron per 100 calories of food, we find that greens come first with 46.4, then meats with 15.6, legumes 13.7, vegetables 10.4, fruits 5.6, cereals 4.3, nuts 2.67, and lastly eggs 1.36.

There is not much use of elaborating on the vitamins in general. We know that there are three chief varieties; the fat soluble "A," which has to do chiefly with growth; water soluble "B," or the one that gives rise to beriberi; water soluble "C," or the antiscorbutic vitamin. Boiling and baking damages these vitamins, so, to insure the proper amount of them in the dietary, a certain amount of raw food stuffs should be eaten each day. In general, fats and oils are rich in the fat soluble "A" and almost nil in the other vitamins. Meats, fish and milk products are more or less divided equally among the three vitamins and cereals

and vegetables have the greatest amount of the antiscorbutic factors. Alkalies destroy vitamins as does the high milling of cereals. Antiscorbutic factors are damaged at the usual temperature of pasteurization of milk. New processed corn meal is deficient in this respect and, to a certain extent, may be the cause of pellagra, for this disease is not found in mountainous regions where the farmers are still grinding their grain on the old burr mills, thus preserving the outer coating of the grain which contains a liberal supply of vitamins. The tomato is perhaps the best single source of vitamins that we have, for it contains all three varieties; therefore, it should be used extensively. The acid is not injurious as it was once thought to be. The potash salts, of which it contains more than most fruits and many other vegetables, tend to alkalinize the blood stream.

Cereals, which are one of the most important sources of foods, have been used for ages but, like many other foods, have suffered much at the hands of modern methods of preparation; for instance, rice is polished, destroying the outer coating and, when eaten alone, is apt to cause a deficiency disease as beriberi. Wheat and other cereals are highly milled, removing the outer coating and destroying the part that contains the salts and life-giving properties. The Scotch use oats as a cereal almost exclusively. They consider scalding the proper method of cooking this grain and, because of this, none of the nutritious elements are lost in preparation. This, together with their buttermilk, has made them a very healthy race of people. We should profit by this knowledge and cultivate a greater liking for such simple foods. The protein of cereals is very good and easily digestible. More whole wheat bread, which contains much bran, would eradicate much of our constipation.

Vegetables are used far too little in the national dietary and we should eat more of them than is customary. The white potato, which is used far too little, is a valuable source of food. The majority of uncooked vegetables should be put through some sort of cleansing process before being used as they are often contaminated by many kinds of bacteria. The taste or quality of the food is not affected by using a weak solution of lye or hydrogen peroxide. Vegetables contain mostly water and their chief use is to supply carbohydrates,

alkaline salts, vitamins and cellulose. Starch is the basic substance of the carbohydrates and, in this form, is most easy to assimilate.

Legumes are very rich in lime, iron and vitamins. The protein in them is inferior in quality to that which is found in meats, milk, eggs, cereals, potatoes and nuts. The soy bean is not included in this category for its protein is of a high quality. Perhaps the reason for the difficulty in digesting them lies in the fact that they are not carefully chewed before swallowing and the close network of cellulose, enclosing the protein substance, is not acted upon in the stomach but in the intestines. These beans should be cooked quickly, instead of over long periods, and this is more easily done with superheated steam than by other methods.

It is hardly necessary to say much about fruits. They are one of the most readily absorbed forms of food and are rich in vitamins and salts with starch and small amounts of protein, of which the apple contains most and, when sufficiently ripened, requires practically no digestion whatever. They are most valuable for cases that are unable to take much solid food. Fruit juices should be used frequently. The acid of fruits, which has been thought detrimental to our balance of alkali and acid in the body, has been proven to be very valuable in alkalinizing the blood.

Nuts are used more as a dessert but, as they are rich in excellent protein, fats and mineral salts, their great food value should be recognized and their use made more common. One pound of walnut meat is equal in food value to from three to twenty-five times as much as any other food or meat except nuts. An almond milk can be prepared by grinding the meats and slowly emulsifying them with water to the consistency of milk. This closely rivals cows' milk and is a good substitute to use for the cases requiring this form of nourishment that have tired of the cows' milk.

Animal foods are considered the chief constituent of our daily diet and it is needless to say that they have been used far in excess of their requirement. Plants are food producers and animals are food users. I have mentioned before that, at this time, it is not advisable to swing from a meat to a strict vegetarian diet, but it is my thought to promote and encourage a much lessened meat diet than that to which we are accustomed at the present time. Meat is chiefly protein in nature and practically all of

it is absorbed but, as the body can handle only a certain proportion of this, the excess is a direct poison to the system which the kidneys and liver must eliminate. We have already seen how greatly over-worked those organs are and we know that they should be saved all unnecessary effort possible. Beef, mutton, fish and fowl are all quite easily digested and, when used as the sole source of protein, their daily requirement, for the average individual, is about one to two ounces.

Animal products, such as milk, eggs and butter, have been considered for ages some of our chief sources of food supply. In milk we have an almost complete protein. Vitamines, organic salts and so forth are there in abundance. This protein is of excellent quality and is more easily absorbed than any other. If taken with vegetables and cereals, we have no need for further food articles. The lime content is higher in milk than in any other single food element. Cottage cheese, buttermilk and similar products furnish not only a good grade of protein but also help to acidify the intestinal flora which is usually teeming with putrefactive bacteria that are apt to lead to many ills. Milk and eggs furnish an excellent form of nourishment for the case that has poor digestion and requires frequent feedings. The whites of eggs are more digestible when only slightly coagulated (as in poached eggs) but the yolk should be thoroughly cooked. Milk is intended to be a perfect food, that is, it has the various elements necessary for the life of the young. It is not necessary to mention that milk should be obtained from tuberculin-tested cattle and, if the bacterial count is very high, it should be pasteurized before using.

In conclusion then, we would say that the diet in tuberculosis should be that of a low protein ration in general and that the protein which is used should be preferably that which is found in milk, vegetables, eggs and fruits; using only as little meat as is absolutely necessary. Increased ingestion of proteins, or high caloric diets, increases the basal metabolic rate of the body with a consequent increased respiration, giving more work to the lungs which are the very organs that we are most anxious to save any unnecessary labor. It also gives extra work to the excretory organs, as the kidneys and liver, causing definite impairment of function in a large majority of cases.

1108 Capitol Street.

NERVOUS, MENTAL AND ENDOCRINE MANIFESTATIONS IN MENOPAUSE.*

By HOWARD R. MASTERS, M. D., Richmond Va.

Instructor in Nervous and Mental Diseases.
Medical College of Virginia.

The normal menopause, or "third phase of life," is accompanied by a train of annoying symptoms that are well known, yet there are a number of cases which become pathologic, possessing varied nervous, mental and endocrine conditions which not infrequently enshroud the approaching change in such a manner that diagnosis is difficult.

The age limit of occurrence may be said, generally speaking, to be between thirty-five and fifty-five; about fifty per cent. taking place between forty-five and fifty, twenty-five per cent. between forty and forty-five and most of the remaining twenty-five per cent. above and below the limit given. One often encounters menopause occurring early in life and, on inquiring into the family history, finds the condition to be familial. Less frequently the onset takes place after the age of fifty-five. It must not be overlooked that artificial menopause from partial or total oophorectomy bears the same marks as that of physiological menopause and should be included. The average age of the true climacterium according to Sanes¹ in an analysis of the literature from thirty-two nations, is 47.1 years.

Concerning the physiology of the ovary, we believe that there are at least two internal secretions, one the corpus luteum derived from the Graafian follicles after their rupture, the other the interstitial secretion derived from the interstitial cells. However, the exact chemical substance or active principle, according to Vincent², like that of iodine from the thyroid and epinephrin from the adrenals, is unknown. It is probable, as suggested by Gustave Bond, that corpus luteum contributes to the fixation of the impregnated ovum and the experimental work of Marshall and Jolly³ would seem to confirm this. These investigators extirpated the ovaries of dogs known to be pregnant and in every case but one pregnancy was discontinued. It is also said that injection of corpus luteum inhibits ovulation. The general view now held by most writers is that the interstitial cells control the nutrition of the reproductive organs and contri-

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bute to the development of the secondary sex characteristics. Experimental castration tends to bear out this statement.

I have ventured to call your attention to the normal function of the ovaries and mention several facts concerning the interruption of this function. Such an interruption is evidenced by the approach of menopause and by the castration of women. A dysfunction of the ovaries is brought about by the menopause. Should pathological conditions exist, the organisms fail to respond, or should it become over-active, then certain syndromes follow unless there is a physiological adjustment.

While the symptoms of the various types of menopause overlap there are certain syndromes which are outstanding and suggest to us the following classification:

I. NORMAL PHYSIOLOGICAL MENOPAUSE. The onset of this class occurs between the ages of forty-four and forty-seven with gradual decrease in menstrual flow until cessation. Next in order of frequency are the vasomotor symptoms which usually come on shortly before permanent amenorrhoea is established. These consist of hot flushes, sweating, faintness, vertigo, "crawling sensations," cold clammy feet and hands and epistaxis. Intestinal symptoms are not uncommon. Emotional upsets and apprehension are frequent. This type usually has a good physical status and has been a stable individual throughout her life, possesses a strong resistance and is able to throw off untoward symptoms. The degree of intensity of the manifestations varies, and a number of women pass through this phase almost unmolested. Increase in body weight, atrophic and fibrous changes and gland cell obliteration mark the close of menopause and the beginning of the senile era. Little or no treatment is needed.

II. CASTRATES—PARTIAL AND COMPLETE. Artificial menopause is usually produced between the ages of twenty and forty-five on account of the existence of some functional or organic surgical condition. Most frequently it is followed by a period in which there is an amelioration of the patient's symptoms after which the onset of the menopause syndrome is very sudden and accompanied by various physical, nervous, mental and endocrine upsets. Menstruation stops completely except in cases where the uterus and an ovary, or part of an ovary, are left intact. The usual

menopause symptoms are somewhat exaggerated. General or localized obesity begins, the skin becomes smooth and soft, frequently losing much of its pigment, and the growth of the head hair may become luxuriant. In the younger individuals there is often a change in personality. They become "flashy" in their dress, loud, talkative, silly and appear to be more easily attracted by their opposite sex. Vincent states that after castration there may be a temporary increase in sexual desire. The change in personality is somewhat similar to the precocity of adolescence and may be due to endocrine imbalance. Atrophic changes of the genital organs and mammary gland usually follow, though the latter occasionally hypertrophy, a condition often confused with obesity of the breasts. It is said that an increase in the growth of hair on the face and other portions of the body takes place; however, this may be evidence of adrenal involvement. Male secondary characteristics may develop especially during senility, numerous cases having been reported.⁴

III. NERVOUS SYMPTOMS ASSOCIATED WITH MENOPAUSE. It may be said that the greatest percentage fall under this class. The principal symptoms complained of are tachycardia or bradycardia, headache, vertigo, insomnia, irritability, tremors, functionally exaggerated reflexes and paresthesias, of which numbness and tingling are most common, and not infrequently pruritus. The vasomotor disturbances probably have a close relationship to the nervous manifestations, especially the paresthesias. The mechanism is probably through the sympathetic nerves of the arterioles and the capillary reflex arcs.⁵

IV. MENTAL SYMPTOMS ASSOCIATED WITH MENOPAUSE. A number of climacteric cases show mental symptoms, while in the neighborhood of thirty to forty per cent. have psychic manifestations of a milder degree and will be discussed in a later paragraph. In some of our series definite psychoses have been noted. Mental symptoms such as depression, excitement, visual and auditory hallucinations, delusions of persecution, sense of unworthiness, suicidal tendencies, violence and maniacal states have been observed. Those cases showing psychic changes often have apprehension, phobias, emotionality, instability, are self

⁴Wright believes that on stroking the skin lightly a white line appears, while deeper pressure brings forth a red line. This phenomenon is analogous to the vasomotor flushings and blanching but being produced by local stimulation and is due to the degree of stimulation of the capillaries.

centered, anxious and possess what are termed "envies," or "inclinations" similar to those occurring during pregnancy. The lack of gratification of these inclinations sometimes leads to anxiety states. A thorough investigation of the patient's past mental history, family history and psychic stability is all important. Some cases have had recurrent depressive psychosis, some mixed manic psychosis, and others anxiety and varied psychotic states previously, and it is in these cases we feel that menopause is contributory only as an exciting cause. The patient possibly has a lowered resistance and generally has a psychotic constitutional or hereditary make-up. Mental disturbances associated with menopause sometimes clear up in a relatively shorter time than true psychoses.

V. ENDOCRINE DISTURBANCE ASSOCIATED WITH MENOPAUSE. Since we have concluded that the ovary is an organ of internal secretion which is essential to the body, we must further conclude that all menopause cases become endocrinous because of the withdrawal of the ovarian secretion. Atrophic changes of the gland begin to take place, menstruation slows down and finally permanent amenorrhoea is established. E. Novak⁶ states that not infrequently is there an increase in menstrual flow during climacterium associated with endometrial hyperplasia and probably due to hypersecretion of the ovary, even in the demonstrable absence of anatomic diseases. The writer believes that this functional bleeding may be greatly influenced by increased activity of the anterior lobe of the pituitary or a hyposecretion of the thyroid gland which is secondary to ovarian hypofunction. Atrophy of the external genitalia, the uterus and at times the breasts, are other signs of ovarian deficiency. Atrophy of the ovaries, sclerosis or cystic formation may take place. On the other hand obesity changes are observed and may be general or localized. Abdominal obesity and trochanter padding are attributed to ovarian hypofunction while other types are said to indicate involvement of the pituitary or thyroid. This increase in fat is in all probability due to lowered metabolism. The body hair is often scant and pigments may be lessened. The patient is frequently languid, sluggish and drowsy.

There seem to be secondary changes, especially in the pituitary, thyroid and adrenal glands during and following menopause.

Tucker tells me that he has observed certain acromegalic changes such as enlargement of the superior maxillae, clubbing of the fingers, broadening of the hands, etc., in some of these cases and in 1917 Emil Goetsch⁷ mentioned that definite hypertrophy of the pituitary gland and enlargement of the sella turcica followed castration both in the humans and other animals. In other cases hyposecretion of the posterior lobe of the pituitary is evidenced by the obesity of the breast girdle and flank padding and increase in the size of the extremities, sparse body hair distribution, scanty perspiration, decreased involuntary muscle tone, subnormal blood pressure, temperature and pulse rate and lowered metabolism.

Thyroid involvement is frequently associated with menopause changes, the characteristic hypothyroid features being dry, scaly skin, slow pulse, low blood pressure, obesity about the face, chin and neck and dry hair. These patients are sluggish and complain of constipation. This type occurs more frequently between the ages of from forty-five to fifty-five in contrast to those who show hyperthyroid symptoms in which the onset of menopause is between thirty-five and forty-five. In the cases of over-secretion of the thyroid, obesity is usually absent, the patient is slender, the pulse rapid, perspiration free, vasomotor symptoms exaggerated, tremors in evidence, and nervous manifestations such as irritability, restlessness and phobias are present. Here we not infrequently find foci of infection as a contributory cause. The blood pressure may be elevated.

Association of adrenal involvement is not uncommon. Low blood pressure, increased pigments, increase in face and body hair and asthenia are said to be indications of hypoadrenalism. This condition is sometimes accompanied by mild depressive phases. Increased blood pressure, irritability and nervousness are evidences of hyperadrenalism. We have noticed that in some of our menopause cases with hypertension the administration of ovarian extracts caused a definite lowering of the pressure. Other organic causes contributing to the elevation of the blood pressure should be eliminated before attributing the rise to increased adrenal secretion.

VI. GENERAL PATHOLOGICAL CONDITIONS ASSOCIATED WITH MENOPAUSE. The physical

condition of the patient at the onset of menopause is important and apparently bears a close relationship to the difficulty that is encountered by the individual in passing through the "third phase of life." Focal infection, whether it be teeth, tonsils, fistulae, or what not, seems to contribute largely to the involvement of endocrine system, urinary system and joint conditions. Hyperthyroidism and hypoadrenalism not infrequently follow infected teeth and tonsils. Other causes which tend to lower the resistance are cardio-vascular diseases, and chronic pelvic conditions, especially those of inflammation. With a lowered resistance, a fertile field is produced and the individual is susceptible to almost any disease. It is here that we must not overlook the fact that the close of the menopause marks the beginning of senility. Elimination and treatment of diseased conditions during this period seem to be an ideal time to attempt prevention of the infirmities of old age.

The prognosis of menopause cases, where organic diseases have been excluded, may be said to be good. Seventy to eighty per cent. of these recover, becoming stable and useful women. With castrates the outlook is less encouraging. They continue to be nervous, have vasomotor symptoms and the onset of pathological conditions is difficult to ward off. Those with nervous manifestations can be controlled to a great extent. In those who have a mental disturbance there is a tendency to recurrence or a continuation of the psychic instability with the development of a psycho-neurosis, and recovery in most cases is slow. Those showing definite endocrine conditions improve greatly while the doubtful ones respond poorly. Symptoms of organic conditions may be alleviated to a moderate degree but in many cases are not especially satisfactory.

Specific organo-therapy is of great value and should be used in those cases experiencing any difficulty. It is particularly useful in the amelioration of vasomotor symptoms. Good results have been obtained from the use of corpus luteum, whole ovarian extract and ovarian residue. It is difficult to suggest the dosage because of the lack of standardization by the various manufacturers. The usual amount given represents five grains of the dried extract administered three or four times daily. The extracts may be obtained in tablet and capsule form and a soluble extract in

ampules for hypodermic injection. In our hands we have obtained the best results with the use of one ampule of the soluble ovarian extract given hypodermically three times a week, or daily, for a period of two to six weeks and followed by the extract in tablet form, five grains three times a day, over a period of one to three months, or longer when indicated. In cases where prolonged dosage is necessary, it is well to give the extract on alternating weeks or months, other symptoms being treated according to their nature. In many cases the use of ovarian extracts is surprising and usually very gratifying.

212 West Franklin Street.

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NUTRITION AND LIFE.*

By. LAWRENCE T. ROYSTER, M. D., Norfolk, Va.

You have honored me with an invitation to address you this evening. I have accepted because of my appreciation of the honor; because I hold the practitioners of orthodontia in high esteem and because I think the medical and dental professions should work in close and cordial co-operation.

The strides which have been made in medical and allied sciences in the past twenty-five years well-nigh stagger our sensibilities when we make even a casual survey of the progress of this period; in fact, the panorama is now passing before our eyes with such amazing rapidity that no man can maintain even the most superficial acquaintance with all the branches, and must of necessity restrict his reading to more or less narrow lines and con-

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concentrate his efforts to a limited field. If we consider this discovery as prophetic, it requires no stretch of the imagination to see that the medical student of the near future must determine at some time during his college course which branch of the profession he will follow, and complete his course with that end in view.

For example, he must determine before graduation whether he will choose internal medicine, surgery, obstetrics, pediatrics or dentistry, with its subdivisions, oral hygiene, oral surgery or orthodontia. You will notice of course that I have placed dentistry in the curriculum of medicine, and this is as it should be.

Whatever branch of the healing art, with its prophylactic, corrective or curative phases, is chosen, an intimate knowledge of the fundamental sciences is absolutely essential to the production of the highest type of professional man.

This vast increase of knowledge with a consequent diversity of interest has developed the specialist, highly trained and exceptionally proficient in a more or less limited field, with the result that all specialties are dependent on each other. Out of this condition has arisen the popular group practice so familiar to us today. Whether group practice is conducted by a number of men closely associated through business affiliation, or whether the opinion of several different men, not actually associated, is sought in the diagnosis of a single case, the effect is the same. Regardless of how well specialized one's knowledge and experience may be, it is necessary that there be the same training in the fundamentals and sufficient understanding of the work of the consultant, in order that his findings may be interpreted intelligently.

But let us bear in mind that specialism is apt to narrow vision as well as activity. Are we not apt to become so intent on the problem, whether it be diagnosis or cure, that we lose sight of the relation of the immediate condition to the individual, and in turn, the individual to society? Are we not apt to content ourselves with the relief or amelioration of the acute condition and forget to consider the future carrying-on power of the patient?

The specialty which requires the broadest vision of life is, perhaps, pediatrics. Not pediatrics as usually defined as "the study and

treatment of disease as manifested in children," but rather a much broader conception—the making of the best possible citizen out of the material as it comes to us during childhood. Diagnosis and treatment of acute conditions alone is not sufficient. To be sure we must treat and aid in the cure of acute disease and save life, and this must be our immediate care; but do we fulfill our duty if we discharge the patient at this point? Most assuredly not! Have we determined what bearing the acute condition has on the future health and earning capacity of the patient? Have we taken advantage of the opportunity thus afforded for a thorough examination with a view to determining his state of nutrition, mental status, condition of tonsils, whether teeth are decayed or maloccluded, and in fact everything which may in any way affect the future of the patient? If we have not done this we have failed in our duty.

Pediatrics, then, in this broad sense is not limited to the pediatrician, but must include the obstetrician, who cares for the child *in utero* through its mother; the family physician, who of necessity treats a majority of the children, and observes the health of the other members of the family which may in turn affect that of the child; the surgeon who operates for an abdominal infection or a hernia; the orthopedist who corrects deformities, thereby making a self-supporting individual out of one who might otherwise become a crippled dependent; the orthodontist, who corrects malocclusions, thus not only preventing early loss of teeth through disuse, but also changing a repulsive countenance into a pleasing one, an important economic factor.

I have said that the pediatrician should concern himself with making the best possible citizen out of the material as it comes to him during childhood. The importance of this phrase must be stressed. According to the laws of biology and heredity, all the possibilities of the adult structure are inherent in the cell at the moment of fructification. Heritable factors we cannot alter but nutrition, on which their development depends, we can control.

The newer knowledge of the chemical composition of food and its relation to the animal economy and the results produced by intelligent application of this knowledge may in truth be termed the "science of nutrition," while the employment of the recently discov-

cred vitamins in promoting growth and development and in correcting abnormal states suggests the term "wizardry of nutrition."

When we observe cases of rickets developed in breast-fed infants, who have been reared in an unsanitary environment and suckled by a mother whose food has been poor in certain food elements, or more frequently, an infant fed artificially on a food poor in these elements, and see this child gradually overcome the rachitic deformity through either the application of sunlight, or the administration of cod-liver oil, or more quickly by both; when we see an infant, who has been fed on condensed milk, or certain dry products high in carbohydrate and poor in fat and protein content, or an insufficient supply of cow's milk, swollen, tender and racked with the pain of scurvy, relieved by the administration of the juice of a few oranges; when we see the symptom complex known as pellagra, with its eruption, wasting, diarrhea and mental disturbance, change from a state of apparent hopelessness to one of comfort and happiness through the administration of a well-balanced ration, particularly one rich in protein; or a pitiful and helpless neuritic of the beri-beri type restored to usefulness and contentment through the administration of the polishings of rice; or again witness the cure of a xerophthalmia (formerly considered infectious) through the administration of a small amount of cod-liver oil, we are almost convinced that the day of miracles has not passed or that necromancy has returned.

Or let us observe the malnourished school child, that child who is fidgety, unable to concentrate, who becomes easily fatigued, is fractious and impatient under restraint, cross with his companions at play, and lags behind in school work, and with all is considerably below the average weight for his age and height; or that other child who has a peculiar temperament and in whom we recognize there is something wrong, though nothing tangible is present except perhaps decayed or irregularly shaped teeth to point to a malnourished state in the past. It is most interesting to see these children change into perfectly normal ones in a remarkably short time through the prescribing of a rationally balanced diet *at regular intervals*, combined with the regulation of habits of life, particularly a sufficient amount of rest. Sometimes in these cases the diet is

rational and results may be obtained by simply regulating the hours, putting a stop to eating between meals, thereby creating an appetite which induces the child to take a sufficient amount of food at meal-time.

To be sure the picture drawn above may result from chronic infections, from teeth, tonsils, etc., and it is presumed that these defects are to be corrected. The same picture with or without low-grade fever may be produced by tuberculosis, and the utmost care must be taken to rule out this condition.

The question naturally arises why the people of former generations and more remote periods of civilization did not suffer from these nutritional disturbances. The answer is paradoxical: They did, and they did not. Some of these conditions have been coexistent with history, some have developed in the course of, and as a result of the progress of civilization. When our domestic animals ran wild and roamed the plains they were compelled to forage for their own food, and this they did with a selective instinct and chose what was good for them and produced the best milk for their offspring, and with almost unerring accuracy rejected what was useless or positively harmful in open seasons. During the rigorous seasons, however, they were often compelled to eat whatever could be found, and as a result many fell victims to a general state of malnutrition. Likewise as they became domesticated as the servants of man their food was selected for them. Instead of the plains and fertile fields they were restricted to the narrow confines of inclosed pastures and compelled to subsist on whatever vegetation could grow there, and when this failed, on dry provender which deteriorated from drying and aging.

So it has been with man. We see him during his savage and semi-barbaric existence, feeding on fresh vegetation in its natural state and on animal food which was consumed almost as soon as it was killed; and having no fixed habitation he moved when food became scarce in one locality to a new home where food could be secured with ease again. And even when grain was first used in powdered form it was milled in a mortar just before cooking. So as civilization advanced through a slow and steady development the food question changed but little until man began to live in cities. Till then, he was troubled little by the problems of nutrition except during times

of famine, drought or war, when the food supply was all but cut off, and invariably under these conditions scurvy developed. Even in the early stages of urban life proximity to the country districts made it easy to obtain the necessary provender within a few hours of production. It was in about this stage of civilization economically, though not socially, that the early settlers in this country found themselves, and so they lived until density of population and economic conditions favored a change which was far more abrupt than any which the world has ever known.

This period of comparative simplicity of living has occupied the greater proportion of civilized life on the American continent. Meat was secured by hunting, or later, by the slaughter of domesticated animals as the need arose, and consumed while fresh because of lack of facilities for keeping, and what small quantity was kept was preserved by a process of smoking which retained the nutrient qualities that would have been destroyed by aging. Vegetables were consumed within a short time from gathering; dairy products were utilized almost as fast as they could be produced and prepared for the table, while grain was harvested and garnered in comparatively small quantities, and milled within walking distance of its source and consumed as soon as milled. And of as great importance these forefathers of ours were housed in primitive structures which prompted an outdoor life in mild weather and were exceedingly well ventilated in winter, for it must be recalled that the almost airtight and overheated homes with which we are familiar are of quite recent development.

But gradually and inevitably increase in population, change from country to city life, and rapidly developing economic exigencies wrought their changes. The vast majority of heads of families ceased to produce their food and depended on the purchase of such commodities as were needed from the small farmer, who, as he rose in the scale of production, grew crops of limited variety, eventually restricting his efforts to the output of a single article. The farm receded farther and farther from the center of consumption, thereby causing delay in transit and the necessity for storage with its consequent aging. Grains of every kind, instead of being produced, milled and consumed within a radius of a mile or so, are

sent several thousand miles and returned to be consumed, after months of delay, thus impairing the vitamin values of the fresh product.

With civilization also came a departure from the simple life, with its simple tastes, and certain refinements of diet were demanded by the upper classes, and this was quickly imitated by the humbler classes, so that white-flour bread, almost devoid of anything but the starchy content, was substituted for the seconds of an earlier period. During this earlier period were developed also certain methods of preparation, made necessary by the limited variety of food products, which formed rational, balanced diets of almost scientific precision, such as the once famous, but now often spurned, corn pone and "pot liquor," the latter being little less than a concentrated essence of vitamins.

These changes in handling the preparation of food products with the consequent diminution of food values have taken place with such rapidity that the human economy has not had time to adjust itself to the change—for a century or two is a very short time in the development of a race—with the result that deficiency diseases have become exceedingly common, and malnutrition almost the rule rather than the exception.

It would appear, then, by the application of the knowledge we now possess we were about to enter a metabolic utopia; this is, however, very far from the case. However much has been learned during the recent past on this subject, it is exceedingly small in comparison with what yet must be learned before we reach this state. A total of three vitamins is now definitely known, with a probable fourth just discovered, and as yet each of these has been studied in relation to a single condition. Each of these may have an influence, probably all have, on metabolism in many other conditions, and it is almost certain that numerous other vitamins exist, concerning whose nature we as yet know nothing. The metabolism of certain of the earthy salts has been studied extensively, and the relation they bear to several abnormal conditions has been definitely determined, while the processes of digestion of the three cardinal food elements, fats, proteins and carbohydrates, have been understood for a number of years. Beyond these facts practically nothing is known.

It is entirely likely that those mysterious organs known as the ductless glands—or when grouped, form the so-called endocrine system, about which so much is written and so little known—play a role, perhaps an important one, in the process of metabolism. The activity of only one, the thyroid, has as yet been measured even partially; and yet it is supposed that one or more of these glands determine the size and shape of one or another of the body tissues, which means that they direct the ability of this or that tissue to assimilate or fail to assimilate, ingested food. It is supposed that each of these glands either stimulates or retards the activity of another of the group. Who knows but that some chemical combination of inorganic material or some unknown vitamin contained in the food we consume either activates or inactivates these glands, and so indirectly governs our growth and development?

The crowning achievement of scientific thought up to the present time is the biological cell doctrine, and to Gregor Mendel we owe the discovery of the fact that various characteristics which pass from generation to generation do so not by chance but by definite rule, in definite proportion and orderly sequence. This is now known as the Mendelian law. Through intelligent application of this law the control of plant and animal life has been made practical, and the development of desirable and suppression of undesirable qualities has reached the stage of scientific accuracy. Could we but control the mating of human stock the effect on the race would not be difficult to visualize.

The factors which determine stature, physique, muscular activity (hyper- or hypo-kinetie), the color of the hair and eyes, the shape of the teeth and contour of the jaw and even the characteristics of temperament, through whatever organ or organs they act, are inherent in the cells and can be controlled only by in-breeding on the one hand and cross-breeding on the other. Yet the activity of these cells and their contained factors are obviously dependent on the soil in which they develop, the food which they assimilate. Therefore who can tell at the present time to what extent all of these matters are influenced, yes, even controlled by the quantity, quality and proportion of food products with which the growing organism is supplied?

In laboratory animals it may be shown that the offspring of a mother fed during pregnancy on food which is adequate for her maintenance, but deficient in a single element, or one marked by the total absence of one vitamin, are undersized at birth or of normal size at birth, yet reach adult life with stature stunted (the small size being out of proportion to a possible application of the law of filial regression), or do not live out the natural span of life. All of these characteristics are familial ones and therefore produced by heritable factors, and yet are unquestionably modified by an unbalanced diet. Which simply means that the cells containing these factors were so poorly nourished that they were incapable of functioning to the full extent of their inherent powers.

Similar experiments show that in animals born of properly fed mothers and themselves robust at birth, when food is supplied in sufficient quantities to meet the caloric needs of the growing organism and apparently perfectly balanced, with the exception of a single element, change in weight and stature takes place in a remarkably short time. If the lacking factor is supplied again within a certain time the animal soon regains its normal strength and development. If its administration is delayed beyond this time, however, regeneration does not take place. The application is too obvious for explanation.

It must be apparent that in whatever field we work, which bears directly on the development of human beings and the maintaining of virility after the period of development is past, knowledge of the science of nutrition is essential. The obstetrician must know what food to supply the expectant mother, so that at birth the offspring will be physically perfect. The physician must know what food is required by the nursing mother to supply the infant with a sufficient amount of fat, carbohydrate, protein, salts and vitamins. Likewise the dairyman must know what forage to supply the cow in order to produce the same quality of milk for the benefit of the artificially fed infant.

The dentist must know the food adapted to the production of teeth of good quality; to prevent deformities of the jaw from mechanical influences and to harden the jaw after correction of malocclusion, thereby preventing a recurrence.

The director of a school lunchroom must possess the same knowledge to adapt the lunches to the needs of the growing child. In fact, every one who deals with "man in the making" must possess this essential knowledge in order that definite ends may be attained.

It may be said that all this calls for such profound knowledge of an intricate scientific problem that it is out of the reach of the average person, but fortunately this is not the case. It is true that fundamental principles should be known, but only a small amount of actual knowledge is needed. What we call a balanced ration, i. e., one which contains a sufficient amount of the tissue-building, energy- and heat-producing elements, together with a liberal supply of the essential vitamins, is all that is needed to carry into practice the principles involved, and any one of a number of small and readable books can supply this. Man can live and thrive on milk, eggs, leafy vegetables and fruits, but of course these would become monotonous, and therefore a variety in food is desirable, but the essentials have been stated. We get what vitamins we need from common, everyday, simple food, and do not have to resort to proprietary preparations and yeast to supply them.

When we recall the fact that at the moment of conception our control of heritable characteristics ceases, that we then must deal with good and bad alike, and that with few exceptions we cannot tell in early life the desirable from the undesirable, but from the palace may go out a fool, and from the cabin may arise a genius, it must be clear, then, that all must be cared for alike and that our duty is to make the best possible citizen of the next generation out of the material as it presents in childhood. Since at present we cannot control the production of the cells making up the human organism, we must do the next most important thing—supply these cells with the best nutrition. Thus we become the moulders, in large measure, of the social fabric of the next generation, and the next; the makers of history through the better-nourished bodies of its citizens, doing our share in the advancement of civilization, and writing the romance of nutrition.

Taylor Building.

ACUTE OSTEOMYELITIS.

The Differential Diagnosis and Treatment.*

By LOUIS A. McALPINE, M. D., Portsmouth, Va.

Of all the acute diseases there are few that are more serious, both from the standpoint of mortality and ultimate morbidity, than acute osteomyelitis. This is true because of the fact that unless an early diagnosis is made septicemia frequently develops or, if the victim of the disease escapes this, widespread necrosis of the bone occurs or secondary foci of osteomyelitis may occur in the other bones. The disease is also serious in that it is rare that the diagnosis is made early enough to institute the proper treatment in order to prevent the morbid changes in the structure of the bone.

In consideration of the seriousness of this infection and on account of the wide diversity of opinion as to what is the proper treatment at the proper time, I have prepared this paper, hoping to stimulate some discussion regarding the differential diagnosis and the treatment of the infection.

In order to consider carefully the diagnosis and treatment, it is necessary to mention the etiological factors concerned in the production of the disease. Acute osteomyelitis is hematogenous in origin, occurs most frequently in children, and is not uncommon in infancy. It follows the acute infectious diseases and is a frequent complication of typhoid fever. In the writer's experience, acutely infected tonsils have furnished the source of the infection in several cases. Local infections, such as otitis media, abscesses, carbuncles, pimples and the like, are sometimes responsible for the production of the disease. Exposure and trauma may be predisposing causes; however, the writer believes that trauma has very little bearing on the development of the disease, although most cases have some history of traumatism. This view is taken by reason of the fact that it is believed, if trauma were a predisposing cause, often we would have osteomyelitis with simple fractures. This, I believe, all will agree, is very rare.

The staphylococci, and principally the staphylococcus aureus, are the infectious agents most often met with, although the streptococcus is sometimes the invading germ. The

*Read before the Seaboard Medical Association at Newbern, N.-C., December 1922.

histological anatomy of the bone marrow is unfortunately concerned to a great extent in the development of the disease. The extremely fine and "loop the loop" blood vessels furnish excellent places for the germs to lodge and the marrow itself furnishes rare culture media for them to flourish upon.

On account of the difficulty of early diagnosis and on account of the difference in the treatment of early and late cases, I prefer to discuss the symptomatology, differential diagnosis and treatment of first, the early cases, and second, the late cases. And when we speak of "early" and "late" in reference to acute osteomyelitis, we are speaking, as a rule, not in terms of days, but we are speaking in terms of a few hours, and we are dealing with an extremely ill patient. Let us qualify "early" as meaning the period from the time the infection of the marrow takes place to the time this infection spreads through the Haversian canals to the subperiosteal tissue; and "late" as the infection of the subperiosteal tissue or the formation of a subperiosteal abscess.

The pathological changes that take place within the cavity of the bone are rapid and extensive. The invading organism usually enters the bone at the epiphysis and inflammatory processes are at once inaugurated. There is vascular distention, associated with thrombosis of many of the vessels, leucocytic infiltration, coagulation necrosis, followed by liquefaction of the intercellular substance, and destruction of the tissue leading to purulent foci. Extension of these areas along the tract of the marrow leads to degeneration of the substance. This constitutes the pathology of the early case, or the first few hours of the disease.

Later, the infectious process spreads into the Haversian canals to the subperiosteal region. The blood vessels of the bone canals become thrombosed or blocked from pressure, and the circulation to the bone is destroyed. There is beginning bone necrosis and finally the formation of a subperiosteal abscess.

The differential diagnosis of the early case is frequently very difficult although the writer believes that, by careful study and painstaking examination, the correct diagnosis can be made in a greater number of cases.

Acute arthritis is the disease which is most often confused with acute osteomyelitis, and this is due to the fact that the infection of

the bone commences at the epiphysis and the symptoms and signs are more or less referable to the joint. However, if the following points are borne in mind, this differentiation will become more apparent. In osteomyelitis, the source of the infection can usually be determined. The disease comes on suddenly with immediate pain in the affected part, pressure or percussion reveals an area of marked tenderness at some point in the bone, and not the joint; the examiner by easy manipulation can move the joint without giving the patient pain. In addition there is high fever, and very severe constitutional symptoms, with a pronounced leucocytosis. In acute arthritis the swelling of the joint coincides with the appearance of the pain and the joint cannot be moved without great pain to the patient. The disease is likely to be poly-articular. The leucocytosis is insignificant and the constitutional symptoms very much less severe.

The early, very serious case of osteomyelitis that immediately overcomes the patient, producing stupor or delirium, is sometimes confused with other infections such as typhoid fever, meningitis or septicemia. These, however, are diagnosed by blood culture or spinal puncture, providing of course, the patient survives long enough for this to be done. In these cases of general infection, Lexer has pointed out that it cannot be decided whether the general infection has developed from the bone suppuration or whether the latter is only an incidental localization of the severe general infection.

Scurvy produces a painful and very tender swelling in the shaft of the bone with mild constitutional symptoms, such as pallor and slight fever, but the severe toxic symptoms are totally lacking.

The late cases of acute osteomyelitis give a much clearer clinical picture. The subperiosteal abscess has usually ruptured through the periosteum and there is extension into the soft tissues, giving all the signs of a very acute inflammatory process. The differential diagnosis in this case is the same as in the early case, with the exception that the examiner has the added advantage of the extensive local signs such as swelling, redness, tenderness and heat.

In the diagnosis of acute osteomyelitis, it must be remembered that X-ray examination is always negative for at least the first ten

days of the disease and must not be considered a factor in the diagnosis.

TREATMENT

The first thought in the treatment of acute osteomyelitis should be that it is an emergency condition and should be dealt with by immediate surgical procedures as soon as the diagnosis is made and, even in those suspicious cases where the diagnosis is not entirely clear, an exploratory operation is not amiss.

Poultices and plasters have no place in the treatment of a suspected infection of a bone and such temporizing measures cannot be too strongly condemned.

Review of the literature brings us face to face with conflicting opinions regarding the extent of operative work to be done in the acute cases. Many authorities advise simple incision over the point of greatest tenderness, and trephining two or three openings in the bone, while others advise the troughing of the shaft for the entire extent of the infection.

Halle even goes so far as to advise only incision of the soft parts and division of the periosteum with drainage, and quotes statistics to show that in 304 acute cases there was a mortality of 16.66% in 144 cases in which the bone was opened, and 7.59% in 79 cases in which there was simple drainage of the soft parts. He believes there is ample drainage through the Haversian canals. Of course he concedes that a secondary operation is always necessary. While bearing these opinions and statistics in mind, it is the humble opinion of the writer that the method of treatment to be employed in a given case should be determined by the extent of the pathology present and not by set rule to cover all cases. Thus, in the early case, that is before the infection has spread through the Haversian canals, a small opening through the cortex of the bone, into the marrow cavity, and drainage will frequently suffice to cure the acute process and make secondary operation unnecessary. Also in the late case, that is, after the infection of the Haversian canals and subperiosteal tissue, it is necessary to open widely the marrow cavity and to remove the spongy infected bone, and drain thoroughly. Frequently this procedure will cure the acute case and sequestration will not take place.

The early case should be drained with either a gauze wick or tube but should not be packed. The late case should be either

packed with gauze saturated in dichloramin-T or Dakinized. There is not much choice between the use of dichloramin-T, packing and the Carrel-Dakin treatment, as far as final results are concerned. There might be a slight advantage in Dakinizing in that there is not the pain and discomfort of frequently removing packing from the wound.

In reference to the use of dichloramin-T, the writer has observed that frequently the solution used is put up in a clear glass bottle and the specimen has undergone chemical reaction on exposure to light, causing a change in color and a precipitation. Any solution of dichloramin-T that has a red clay color and a precipitate in the bottle has either been exposed to light, or improperly prepared and is absolutely useless. A 5% solution of dichloramin-T in chlorocasane oil has about the same color and consistency as castor oil.

In the operation on either the early or the late case, no curetting of the marrow cavity should be done, as this destroys the osteogenetic cells and delays regeneration of bone. A very important point in the treatment of any case is that the primary focus of the infection should be removed, if possible.

CONCLUSIONS

1. Acute osteomyelitis is a serious disease, occurring generally in childhood, and frequently causes death or permanently disables the victim.

2. The disease may be divided into "early" and "late" cases according to the extent of the pathological processes taking place in the bone. The "early" cases are those in which the inflammatory reaction is confined to the marrow cavity and the "late" are those in which the inflammation has spread through the Haversian system to the subperiosteal tissue.

3. The differential diagnosis of the "early" case is sometimes difficult but can be made more often by painstaking examination and a critical analysis of the symptoms and signs of the disease. The "late" case presents a more definite symptom complex and the diagnosis is more readily made.

4. The treatment of "early" cases consists of opening the medullary cavity and drainage of the infected area by means of gauze or a tube. The "late" case is treated by means of widely opening the medulla, removing the infected bone, and packing with gauze satur-

ated in dichloramin-T, or by Dakinizing. These methods frequently will cure the acute osteomyelitis and sequestration will not take place.

SOME ESSENTIALS IN FRACTURE WORK.*

By GEORGE H. REESE, M. D., Petersburg, Va.

As indicated by the title of this paper it is limited in scope to general principles, being a crystallization of my observation and experience derived from four years of industrial surgery at Hopewell, and at Old Hickory Works, near Nashville, Tennessee. At the end of this period I had the satisfaction of emerging without a lawsuit to my discredit, or a broken bone treated of which I had reason to be ashamed. The factors contributing to this measure of success I shall endeavor to set forth, as space permits, for the consideration of others engaged in the same kind of work, with no more training or experience than I had when I assumed this obligation.

It is self evident that the first important requisite in the treatment of fracture is that the surgeon should have an accurate mental picture of the condition with which he has to deal. He must have a sound knowledge of anatomy, physiology, and pathology; for it is upon these essentials that all diagnostic measures are reared. He must have mechanical skill. Without these three fundamentals no one can ever hope to treat fractures successfully.

With this equipment assumed, we may ask, what are the diagnostic points in fractures? and answer: preternatural mobility with bony crepitus, and X-ray confirmation. Deformity, ecchymosis, and persistent pain are highly suggestive, and I would urge for them, careful consideration; but they may attend other traumatism or be the result of an old disease or injury, or be the simulation of a skilful malingerer. All the other symptoms and signs of fracture unaccompanied by the above may, for all practical diagnostic purposes, be forgotten.

All cases of traumatism should be X-rayed. Do not confine the X-ray to known fractures or suspicious cases, otherwise fully 10% of fractures will go undiagnosed as such. Have them X-rayed in two or more positions. One

picture is useless as a rule, for either scientific diagnosis or treatment. The information gained by the surgeon who has cases thoroughly X-rayed is amazing to himself and of untold value to his patient. He finds a fracture where he could hardly notice a contusion. He finds a known or suspected fracture associated with another fracture, or an unsuspected dislocation. He may have a slight or serious laceration, which is really a compound fracture, and fail to treat it as such without X-ray confirmation. He may have an impacted fracture which it would be unwise to disturb; or a transverse fracture without displacement, to say nothing of other fractures, which might result in confusion to himself and disaster to his patient should manipulative attempts be made under ether or otherwise, to elicit the pathognomonic signs of fracture. Comminuted fractures, linear fractures, impacted and all other fractures, are revealed by the X-ray and differentiated as by no other method.

Should open operative treatment be in mind, its character will be determined by radiographic findings, or the necessity or the advisability of this form of treatment indicated. The advantages to both patient and surgeon of thorough radiography, before the injury is further manipulated, are so many and so vital, that it is amazing to find in most books the statement, that if only one X-ray picture can be had, it should be taken after the fracture has been set. This is a negation of the value of accurate diagnosis, without which there can be no assurance of proper treatment; it is utterly selfish and to our way of thinking the most pernicious idea ever advanced about a condition, where diagnosis often means everything.

When a fracture is encountered it should be treated with the utmost gentleness and the least possible movement of the bones permitted before the final dressing is ready to be applied. If in great pain or shock the patient should be given morphine at once, and the limb gently straightened and splinted before transportation is undertaken. No attempt should be made at reduction until everything is ready for the permanent dressing, unless the fragments are threatening to erupt, or are impinging upon blood vessels, nerves or other important structures.

All fractures should be set as soon as possible. Delay is often convenient for the surgeon, but

*Read at a meeting of the Southside Virginia Medical Association in Petersburg, March 1923.

inevitably adds to the distress of the patient and to an increase in his pathology. In severe shock, in fractures associated with burns, severe abrasion or lacerations, often this rule has to be evaded. A complicating hematoma may be aspirated under aseptic conditions, a compressive dressing applied, and fixation proceeded with as usual.

In all compound fractures great care should be taken not to add to the existing infection. Consequently it is of the greatest importance not to let the exposed bone ends retract until they and the surrounding wound have been thoroughly disinfected. This should be done with full strength iodine and an aseptic dressing applied before the patient is moved. If this is impossible, he should be hurried to the operating room as gently as possible, the wound thoroughly scrubbed clean of all foreign matter with guaze sponges saturated with iodine; bone fragments, etc., removed with sterile instruments, and proper drainage provided. If necessary, enlarge the wound to any extent demanded for thorough inspection and removal of all suspicious material.

I mentioned iodine as the initial disinfecting agent because it is time honored, efficient, and almost universally available. Other disinfectants may be used and some of them are doubtlessly as good as iodine.

As a secondary disinfectant of compound fractures, nothing has a superior record to Dakin's solution. Other chlorine compounds are highly efficient. We found them more troublesome to obtain, keep fresh, and to administer, however, than our old routine of iodine followed by apinol. This latter made its own way with us as a highly efficient, un-irritating antiseptic. It is efficient as a cleansing or antiseptic agent, either alone or combined with 10% tr. of iodine. For the treatment of lacerated wounds, it gave us most excellent results.

The above remarks presuppose a rigidly aseptic technique. Under no circumstances should any unsterile object be brought into contact with a compound fracture. Only in unavoidable conditions should even the gloved finger be introduced into the wound. Cleaning the injury with sterile instruments, gauze and antiseptics, should be accomplished without any unnecessary digital invasions. To ignore this rule is to invite trouble.

In setting a fracture of consequence, general

anaesthesia is usually indispensable. This should be insisted upon by the surgeon and the blame for its omission placed squarely upon the patient. Exact approximation of the fragments is the ideal to be attained, and the surgeon is entitled to every aid in his effort to secure a perfect anatomical and functional result. This attainment is impossible when combated by spastic muscles and a resisting patient. It is not always easy to secure accurate reduction even by open operation under general anaesthesia; hence the folly of attempting the reduction of any major fracture without deep narcosis.

Most fractures are best set under the fluoroscope. If this is impossible, set them as usual and check by radiograph before completing the operation. If unsuccessful in the first attempt, repeat the performance as often as necessary in order to secure a good result. If such cannot be approximated after repeated trials, open operation may be justified, provided surrounding conditions are such as to warrant so radical a procedure.

The conversion of a simple fracture into a compound fracture is a step to be taken only as the last resort. This is rarely necessary in the fractures of long bones but, strange to say, this is where most of it is done, and where most of the wiring and plating is perpetrated.

There are some fractures that demand open operation for successful reduction; for example some fractures of the jaw, some fractures of the patella, olecranon, and some fractures with dislocation. When such lesions are encountered, they should be operated upon at once and the fragments neatly approximated. If any internal fixation is necessary, it should be accomplished by an autogenous bone graft, bone peg, chronic gut, or kangaroo tendon. If wire or plates are ever used, they should be inserted with the understanding that they are to be removed as soon as the bone has united. When left, they almost invariably give trouble. This should be borne in mind whenever any unabsorbable material is used.

There is scarcely any justification in modern surgery for the use of wire in fractures, and but little more justification for the use of plates. Used surgically, they are intended merely to approximate the fractured bone ends, not to splint them. The splinting has to be done by other methods; hence the need of wire and plates for purposes of approximation vanishes.

In the application of external dressings, everything depends upon the skill and ingenuity of the operator and scarcely less upon well trained assistants. Every surgeon has to adapt himself and methods to meet the variations of each individual case. He cannot do his best unassisted and should not from a medico-legal standpoint undertake to set a major fracture alone.

The immediate complications of fracture, such as injury to the brain, bladder, nerves, and bloodvessels, of course, require added attention to each specific need.

The late complications, such as necrosis, ulceration, gangrene, paralysis of nerves, and excessive atrophy and paralysis of muscles, are usually due to faulty methods of fixation or to improper or neglected after treatment.

After treatment is a factor of prime importance in the successful management of fractures. The splints should frequently be removed, the skin inspected for trophic disturbances, the parts bathed with alcohol, and gentle massage and passive motion instituted. Stiffness of joints can be eliminated almost entirely by early passive motion. This should be commenced within a week or ten days of the injury, under gas if necessary, and be gently and gradually increased, until full movement is attained. Suppurative wounds of the joints were found by the war surgeons to be highly benefited by this simple procedure. By persistent effort, the joints in simple fracture should be normal in motion, or nearly so, by the time the bone has solidly united. This means a great deal to the manual laborer.

In the old and the debilitated, in those confused about the thorax, ether, as an anaesthetic, should be avoided, if possible. Gas oxygen or chloroform should be used instead. These patients are prone to develop hypostatic or traumatic pneumonia and nothing should be done to increase this tendency.

In splinting the fracture, leave the patient mobile, support him by appropriate constitutional measures and circulatory stimulants, elevate his body, if feasible, and as soon as possible get him up and about on ambulatory splints. Treating the patient in the aged is of far more importance than treating the injury. The syphilitic may require anti-syphilitic treatment, while the alcoholic may spring delirium tremens, or traumatic insanity develop in any

severe case, necessitating control before successful union is secured.

Success in fracture work is won by the taking of infinite pains. This paper is a plea to the general surgeon and practitioner to bestow a greater skill, consideration and effort, upon this neglected branch of surgery than has been given in the past.

Many surgeons, for reasons best known to themselves, are disinclined to engage in traumatic surgery. Some have referred to their war experience as blunting their technique and tending to unfit them temporarily for work in private life. In this connection it may be well to note the one great surgical achievement of the war. Dr. Alexis Carrel, already a surgeon of world-wide fame, being dissatisfied with his own technique and that of the French and British surgeons, set about to discover a better method of treating infected wounds. As a result of his labors, hundreds of lives have been saved, and thousands of limbs are sound and well that otherwise would have been lost.

X-RAY IN THE TREATMENT OF CANCER.*

By DANIEL D. TALLEY, JR., M. D., Richmond, Va.

In this paper some attempt will be made to outline the problems attendant upon the employment of the rays in malignant disease, to comment upon the measure in which these problems have been overcome and to discuss briefly the relations of the rays to the other principal methods now used in treating cancer: not so much with an idea of establishing the superiority of any one method or agent, but with regard to the co-operative use of all.

That both the X-rays and the rays of radium have the power of causing destruction of cancer cells within the living body, if applied to the involved area with sufficient intensity, has been well established and is universally admitted. The desiderata therefore have been (1) the constant production of rays powerful enough to produce desired effects in the deepest tissues of the body, (2) the accurate measurement of such applications, (3) the complete destruction of the irradiated pathological condition without doing injury to the skin and healthy tissues around or above the growth, and (4) the avoidance of harmful constitutional effects or alarming symptoms which

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may follow the use of the more penetrating rays in large quantity, over areas of considerable size.

The advent of the Coolidge tube approximately one decade ago was a great step in the advance of Roentgen ray therapy, in that it made possible the constant production of rays of deeper penetration than could be produced previously for practical purposes. This widened the field of this therapy, since it enabled us to influence malignant cells in the deeper tissues to an extent hitherto impossible. Less than five years ago the German roentgenologists began to employ apparatus capable of delivering rays of a far greater penetrating power than anything previously produced and with these rays of powerful penetration still more satisfactory results began to be reported. The use of this method of technique, at least to any considerable extent, has in this country been limited to a period of less than two years, but apparatus for its employment is coming into more and more general use.

As many readers may be unfamiliar with certain principles in the production, employment and effects of the X-rays, it is believed that a few words of explanation here may be helpful: (1) The rays produced from any X-ray tube are heterogeneous. That is, no matter how high the penetration of some of the rays may be, there will also be produced at the same time rays of lower penetration which would naturally be absorbed by the skin and superficial tissues and thus damage same in attempting to produce deep effects. In order to obviate this damage, filters are interposed in the path of the rays which allow only the more penetrating ones to pass through and thus reduce skin absorption to a minimum. Aluminum and copper are the most common filter materials now in use. (2) The rays of higher penetrative power are of relatively short wave length and are produced by currents of much higher voltage than are those of lower penetration. (3) From the primary X-rays entering the tissues, so called secondary rays are produced in the tissues themselves, to which a considerable proportion of the destructive effect is due, though the primary rays also contribute to the result. (4) The intensity of the rays varies inversely as the square of the distance of the tube focus from the area treated. This law is responsible for the fact that the further away the tube is

from the body surface the more nearly equal will be the intensity of the rays in all the tissues irradiated. (5) If a deep lesion be irradiated from several different directions or through several so-called "ports of entry," a maximum effect may be produced in the lesion with a minimum skin damage, as a different skin surface is exposed each time.

Experience has shown that the ideal way to treat malignancy with radiation is to destroy it as quickly as possible by attacking boldly, and if possible, administering a lethal dose to every part of the growth at one sitting, or in a few treatments given over a very short period of time. The reason for this is that incompletely irradiated growths tend to acquire increased resistance to repeated radiation, and it has been claimed that a very small dose will stimulate instead of destroy.

The application of this principle may require many hours of treatment at one time or spread over a few days and has brought several new problems for solution. One of its results is the more or less profound condition of radiotoxemia characterized by nausea and vomiting, diarrhea and extreme weakness and possible rise of temperature. These symptoms may be especially profound after extensive abdominal radiation. Symptoms usually last only a few days but may be prolonged, and large doses or overdoses have even led to occasional fatalities. As the blood stream passes beneath the irradiated areas, its cellular constituents receive the effect of the radiation and certain changes take place which may require weeks or even months to become restored to normal. Other changes may take place in normal organs and tissues. These facts render the administration of intensive deep roentgen therapy a procedure requiring careful and intelligent consideration and study, and make it increasingly dangerous if the general vital forces are not up to normal. It is contraindicated if cachexia has begun.

Another problem is the question of dosage. For instance, not only does carcinoma require a different dose for its destruction from sarcoma, but one type of either of these tumors may respond to a dose which would not destroy another type. Furthermore, it has been pointed out that the kind of normal tissue in which a tumor grows may have a marked bearing upon the radiation susceptibility. In treating malignant growths which involve deep

tissues, it is ideal to give a radiation dose which will be just sufficient to destroy all the pathological cells without producing damage in the surrounding or overlying healthy tissues, it being a well established fact that cancer cells are less resistant to the rays than normal tissue cells. Irreparable injury may be produced if the dosage is sufficient to destroy normal structures. As a result of extensive experimentation and study, both on the part of the physicists and the clinical workers, the question of accurate measurement of dosage in the deeper parts of the body is being worked out, this problem being by no means a simple one. It is further complicated by the fact that the power to diagnose the entire extent of the malignant growth is limited, especially in the more deep seated lesions.

The problems of ray therapy have likewise been taken up by the pathologist and biologist notably with regard to the tissue changes produced by irradiation and the reaction of the normal tissues, which may be an important factor.

The foregoing remarks are intended to show that careful study and special medical knowledge are required to employ the roentgen ray proficiently and that much concerning its effects and methods of administration has yet to be learned. The remainder of my remarks will tend further to bear out these facts.

The two most efficient methods in the treatment of malignant disease today are surgery and radiation, or radiotherapy. Radiotherapy includes the use of both the X-rays and radium. The effect of these two agents upon cancer cells is practically identical and they should be considered rather as adjuncts to one another than as rival forces. Without going into physics, it may be said that X-rays may be produced in far larger quantities than radium rays and are thus more useful for application to large and deep areas. Radium may be introduced into cavities or in various forms may be buried in the pathological tissues, and when so used in more or less close contact with the area diseased may be more efficient than the X-ray. Its destructive power is limited, in the amounts available for use today, to a distance of a few centimeters into the tissues. The advantages of the X-ray, therefore, are in external radiation, those of radium where the salt or the emanation may be brought into contact with the malig-

nant tissue. It will thus be seen that there are many types of malignancy where the X-ray and radium can be used to the best advantage in conjunction with one another. Certain of the gamma rays of radium are of shorter wave length than any known and are more efficient in their effects on malignancy. In order to compete externally with the X-rays as now produced, however, huge amounts of radium would be required at a prohibitive cost. Schmitz believes the ideal would be to produce with the X-ray the effect of the gamma ray of radium. As the apparatus is at present constructed, the X-rays produced are not of short enough wave length to do this but the opinion is held by some that for practical purposes they are efficient.

What relation does radiotherapy bear to surgery? Surgery in malignant disease may in a sense be regarded as a finished product, in that as far as we can now see, no new methods of technique are likely to influence cancer mortality to any great extent. That the practitioners of surgery themselves are far from satisfied with the results of their art as applied to cancer is well known to anyone at all familiar with operative statistics of this disease.

The conscientious surgeon, therefore, should welcome and does welcome any agent whereby the cancer mortality may be reduced for use (1) in cases where the results from its employment may be superior to those obtained by operation, (2) in cases where a combination of methods may promise a cure, unobtainable by either method alone, and (3) in cases where surgery cannot be employed with any reasonable hope of success. Reliable opinions seem to justify the belief that radiotherapy comes nearer to filling this need than any other known agent.

No argument will be here set forth to advance claims for radiotherapy in those cases which are really operable; that is, where there is reasonable assurance that the whole of the cancer tissue may be removed without recurrence or metastasis. There are exceptions to this rule, as for example in most cutaneous cancers, where X-rays or radium occupy an established position, and in the first stage of cancer of the cervix uteri where statistics of five year results show that even at the present day radium alone or in conjunction with intensive X-ray therapy can compare favora-

bly with surgery, so that some surgeons prefer the former method. In those cases of malignant disease which are on the borderline of operability, it is fairly well established that more satisfactory results have been obtained by surgery when either preoperative or postoperative radiations, or both, are used. The instances in which apparent arrest of the disease has been secured in inoperable cases by radiation alone are many; its use in the treatment of local recurrences after operation is gratifying; and the palliative and occasionally permanent results after deep metastases are worthy of note.

Of the high voltage X-rays of short wave length and deep penetration above referred to, it may be said that the results reported by foreign observers have been generally received in this country with a commendable conservation. It has been believed that some of these reports have been much tainted with over-enthusiasm and they have been correspondingly discounted. Furthermore, sufficient time has not elapsed since the inception of the newly modified form of therapy to speak of what the real and final results from its use may be and many problems of its administration yet remain to be solved. It may be admitted that the dangers do not seem to be contraindicated to its use in competent hands, and that many of its problems seem possible of solution, but the time is not yet ripe for positive statements.

Giving the foreign reports a reasonable amount of credence, however, and judging from the statements which come from those who have had any considerable experience with the use of such rays in America, it would seem that the results are superior to any obtained previously, and that the outlook is favorable for still more gratifying achievements.

That any achievements from radiotherapy will be enhanced by earnest co-operation between surgeon and radiologist in selecting cases for treatment, in planning this treatment, and in carrying it through is believed to be obvious and unnecessary of further comment.

104 Professional Building.

THE "CATTLE-TRUCK" SYMPTOM.

By COURTNEY EDMOND, M. D., F. A. C. S.,
Clifton Forge, Va.

Mrs. "B.", naturally much agitated, 'phoned that a spot had suddenly come before her right

eye and that it would not go away, asking what should be done. The reply was that she should first come to the office, allow the trouble to be determined and then be advised as to treatment. She came within about thirty minutes, stating that the spot was enlarging, the vision worse, and that she could see but imperfectly in an upward direction only. Suspecting closure of the retinal artery, the following brief history was quickly obtained:

Age 26, healthy, married, two children. On other occasions for many years, at long intervals, the same kind of spot had appeared before the right eye, only to promptly disappear with slight annoyance. The present attack was different because of the greater visual disturbance and the longer duration.

Macroscopically: The affected eye presented a pupil a trifle larger than its fellow, reacting to light somewhat sluggishly. Intraocular pressure unchanged to palpation. Vision greatly reduced centrally with a kind of ebb-and-flow of peripheral vision.

Ophthalmoscopically: Right pupil noticeably larger; fundus-reflex whiter than normal; ocular media clear; papilla pale; retina ischemic, particularly about the macula where the smaller vessels stood out more clearly than usual; no hemorrhages; no visible embolus. The macula was a red spot in marked contrast with its paler environment, the "cherry-red-spot." The classical symptoms of occlusion of the central artery were well developed. The retinal vessels were but slightly narrowed, with the following striking picture in the upper temporal artery and vein: The blood-stream in these two vessels was broken up into hundreds of minute moving segments, or cylinders, of blood-cells with intervening clear spaces of plasma; a kind of slowly moving procession of beads of blood, which has been designated the "cattle-truck" appearance.

This procession of cylinders represented a diminished blood-stream and all were moving at about the same rate of flow, without jerking or hesitation, outward in artery and inward in vein, or according to the natural current. Where the vein crossed over artery, with a distinct bend in the former, the little cylinders could be observed to hurry, or "speed-up," as if wishing not to be seen while coursing the bend of the vessel. It appeared as if gravity might be having special effect at this point.

At the papilla the cylinders piled end-on-end, forming a continuous blood-stream but without visibly elongating the stream during the interval of observation. The motion described was not the result of digital pressure except that the patient stated she had been rubbing the eye rather frantically in efforts to dissipate the cloud. In fact, I could not determine at the time of the office visit that such pressure had any appreciable effect upon the moving cylinders. The following morning there was no "cattle-truck" symptom.

This simile, no doubt, is of English origin, as I am informed that the American cattle-car, or its equivalent, in England, is called "cattle-truck." While a bit fanciful, a train, or procession, of reddish cattle-cars reduced to ophthalmic proportions might prove a close resemblance to the remarkable picture referred to, the writer shall lay no claim to the discovery of the analogy.

There is, perhaps, little to justify this report. It may but enroll another upon the list of those who have observed this well known phenomenon which is diagnostic of arterial occlusion. Attention, however, might be directed to the history of previous transient obscurations of vision in the right eye, when, no doubt, the lumen of the artery was threatened; the excellent physical condition of the patient, without heart-lesion or other apparent source of embolus, and the reduced blood-stream as seen with the ophthalmoscope. These would appear to be points against embolism and in favor of an endarteritis or thrombotic process. Not all are in harmony with an eminent authority who surmises that emboli may circulate normally, or in those but slightly ill, lodging often where no notice can be had of their situation, the patient, of course, being unable to escape attention to an embolus affecting vision.

In the several cases of so-called embolism occurring in my practice, none before has given history of prodromal attacks of fleeting blindness, although I am aware that such history is not unusual. It was my first opportunity to observe the "cattle-truck" symptom, and I could but meditate upon what a perfect, vivid demonstration was afforded of the circulation of the blood and the differing directions of arterial and venous flow. It was an ophthalmoscopic entertainment and the one good "movie" I have seen.

Analyses, Selections, Etc.

The Pathogenesis of Subacute Combined Degeneration of the Spinal Cord, with Special Reference to its Connection with Addison's (Pernicious) Anaemia, Achlorhydria and Intestinal Infection.

The authors point out that, in the past, the nervous system in this combination has been studied chiefly by neurologists little interested in the anaemia; or by physicians whose attention was focused on the anaemia largely to the exclusion of the neurological aspect of the subject. They refer to the increasing frequency with which spinal cord symptoms are recognized in Addison's anaemia as they have become more systematically looked for, the later reports placing the figure at approximately 80 per cent. On the other hand, they note an increasing tendency toward recognition of the anaemia associated with this lesion of the cord as belonging to the Addison type of anaemia. They so regard the blood picture in the eight cases of the degenerative cord condition reported by themselves.

Having thus related these two syndromes to each other, they consider achlorhydria as a link in the chain of pathogenesis. Achlorhydria is the most frequent of all the ear-marks of Addison's anaemia, not excepting the classical blood picture, occurring in about 96 per cent of cases. Furthermore, they consider it firmly established as a condition precedent to the blood changes. Likewise they found an achlorhydria persisting throughout digestion in each of their eight cases of subacute combined cord degeneration; whereas its frequency in other conditions is shown in the table given on next page.

In three cases suggestive of subacute combined degeneration, but with a normal gastric acidity curve, the diagnosis eventually proved to be syphilis of the spinal cord.

The authors' ideas as to pathogenesis are clearly stated. They believe that Addison's anaemia only develops in individuals who have achlorhydria. The anaemia is caused by haemolytic toxin absorbed from the intestine, where it has been produced by the action of bacteria coming originally from the mouth, the presence of achlorhydria having deprived the stomach of its antiseptic powers, which normally exert a powerful influence in protect-

TABLE III. RELATIVE FREQUENCY OF
ACHLORHYDRIA IN VARIOUS
CONDITIONS.

Achlorhydria						
	Number cases	Number	Percent	Low acidity	"Normal" acidity	High acidity
Normal (Bennett and Ryle) -----	100	4	4	1	87	8
Various medical dis- eases (Bell) -----	425	63	14.8	53*	205†	104‡
Addison's (pernici- ous) anaemia -----	66	64	96	1	1	0
Carcinoma of stom- ach -----	10	3	33	3	3	0
Subacute combined degeneration of cord -----	8	8	100	0	0	0
Tabes dorsalis -----	9	1	11	1	5	2
Disseminated sclero- sis -----	8	0	0	1	7	0

*12.5 per cent.

†48.3 per cent.

‡24.4 per cent.

ing the bowel from such infection. In addition to the haemolytic toxin, there is a neuro-toxin. Although one or the other may appear to be present alone in the early stages, it is rare for the haemolytic toxin, and still more rare for the neuro-toxin, to continue to be produced without the other throughout the course of the illness.

Naturally, in treatment, these authors emphasize the most painstaking and complete eradication of dental, tonsillar, and sinus infection: the administration of dilute hydrochloric acid in sufficient dosage, usually 1½ drachms in 4 oz. of water, preferably with lemon juice and sugar. The acid is to be sipped during and for half an hour after the meal, and continued during life.

Active lactic acid milk, and a vaccine from any streptococcus obtainable from the mouth, duodenum, faeces or urine, are also recommended. Transfusions when indicated, and arsenic, with due care lest an arsenical neuritis be obscured by existing cord lesions, are of value. Little can be expected in the matter of cord symptoms beyond arrest of their progress, though some improvement may be obtained by systematic exercises. (*A. F. Hurst, M. D. Oxon and J. R. Bell, M. D., Melb.: Brain, XLV., Part II, page 268*).

J. H. S.

Proceedings of Societies

The Augusta County Medical Association

Held its annual meeting and members were entertained at the home of the retiring president, Dr. J. B. Stone, of Churchville, Va., August 1. There was an attendance of about 30 members and visitors and 25 ladies. Dr. John Wilkins Brodnax, of the Medical College of Virginia, delivered an address on "Art as Applied to Medicine," which was illustrated by lantern slides. Dr. J. C. Flippin, of the University of Virginia, the other invited guest, was prevented by death in his family from attending. A paper was also read by Dr. Kenneth Bradford, of Staunton, on "Infectious Diarrhea in Children." The treasurer, Dr. J. F. Fulton, of Staunton, reported a balance of \$100 in the treasury.

Officers elected for the coming year are: President, Dr. Alex. F. Robertson, Staunton; vice-presidents, Drs. F. E. Hamlin, Staunton, Thornton Hankins, Fordwick, Harry White, Fishersville; secretary, Dr. H. G. Middlekauff, Weyers Cave; treasurer, Dr. J. L. Alexander, Staunton, new member of board of censors, Dr. R. S. Griffith, Basic.

A Delegate's Notes from the National Women's Medical Auxiliary.

The American Medical Association at the Convention in St. Louis in 1922 adopted a resolution presented by the Texas delegation that a Woman's Auxiliary should be formed in each state. A temporary organization was formed by the women who attended that meeting, and a permanent organization was effected at the recent San Francisco Convention.

Mrs. Red, of Texas, the president, called an informal meeting on Tuesday morning, June 26, to discuss the constitution and policies of the Auxiliary, about twenty ladies being present. The first regular business meeting took place at the beautiful Fairmont Hotel, Thursday morning, June 28, with a large number of ladies in attendance, representing many states. Mrs. Red gave all a most cordial welcome, and presided with grace and dignity, and explained the object of the meeting. Her report of the work that had been accomplished during the past year, especially that of the Texas Auxiliary, which was organized five years ago at the suggestion of Mrs. McReynolds, was most interesting and inspiring. There were four past

state presidents, and three recording secretaries from Texas present.

Dr. Southgate Leigh, of Norfolk, Dr. Seale Harris, of Birmingham, and Dr. McReynolds, of Texas, all spoke briefly on what the Auxiliary could do to help the medical profession, such as getting better sanitation in the schools and in the homes of the poorer classes, and creating a sentiment against the various fads, fakes, and cults, that are sweeping over the country and deceiving so many of the uneducated.

After the addresses, Mrs. Red stated that fourteen states were represented at this meeting, that ten were already organized, and that much interest was being manifested in this pioneer work to aid the physicians. Mrs. Red told of her visit to Birmingham, where she, with the able assistance of Mrs. Seale Harris, had organized a very enthusiastic auxiliary, and at the invitation of Dr. Long, the president of the North Carolina Society, she attended the State convention last May in Asheville, and organized its auxiliary, Dr. Long giving many valuable suggestions, and this movement now has the enthusiastic co-operation of the women of that state.

The business session was followed by the election of officers, which are: Mrs. S. C. Red, of Houston, Texas, president; Mrs. J. Allison Hodges, of Richmond, Va., president-elect; Mrs. Southgate Leigh, of Norfolk, Va., Mrs. Robert E. Farr, of Minneapolis, Mrs. Seale Harris, of Birmingham, and Mrs. F. P. Gegenback, of Denver, vice-presidents; Mrs. W. A. Wood, of Waco, Texas, recording secretary; Mrs. H. L. D. Kirkham, of Houston, Texas, corresponding secretary; Mrs. A. E. Baker, of Charleston, S. C., treasurer; and Mrs. Harris Smith, of Delta, Colo., parliamentarian.

Each of the four vice-presidents was assigned twelve states to organize during the next year.

As previously reported in these columns, Virginia was organized last Fall at the meeting of the State Society in Norfolk, with Mrs. R. Lloyd Williams, of Norfolk, as president, and since then several auxiliaries have been formed in different sections of the State. The Virginia Auxiliary was represented at the Convention in San Francisco by two delegates, Mrs. J. Shelton Horsley and Mrs. J. Allison Hodges, of Richmond, and Mrs. Southgate Leigh, from

Norfolk, as the first vice-president on the National Board.

It is regretted that more members could not have attended this meeting to gain inspiration for the work, and to have enjoyed the lavish hospitality extended by the ladies of San Francisco. California and the Golden Gate looked most beautiful that brilliant June day when the delegates arrived after their long trip, and the West more than ever sustained its reputation for "receiving strangers with open arms," for not only were the visitors handsomely entertained in the Convention City of San Francisco, but in several cities en route, and the doctors in Albuquerque, Los Angeles, and Portland, provided motor trips and delightful hospitality for the few hours the delegates stopped when passing through these cities.

The Convention, as an event, is over, but as a golden memory and inspiration, it will linger all through life.

M. G. H.

The Medical Women's National Association

Held its ninth annual meeting in San Francisco, June 25 and 26, in conjunction with the American Medical Association meetings. Dr. Grace N. Kimball, President; Dr. Kate Campbell Mead, President-Elect. At the open session, Monday evening, Dr. Ray Lyman Wilbur, President-Elect of the A. M. A., delivered an eloquent and inspiring address on "The Power of the Minority."

At the open session, Tuesday morning, a Five Year Program was presented by the Executive Committee and Council, and was adopted. This Program is under Five Heads:

1. Continuation of the Work of the Committee on Medical Service, American Women's Hospitals; Dr. Esther P. Lovejoy, Chairman, 637 Madison Ave., New York.

2. Federation of American Women's Organizations with the Medical Women's National Association, under Organization Committee; Gertrude A. Walker, Chairman, Whitefield, N. H.

3. Public Health, Co-operating with A. M. A. Council on Health and Public Instruction, Hygiene, and Women's Foundation for Health, etc., Dr. Elizabeth B. Thelberg, Chairman, Vassar College, Poughkeepsie, N. Y.

4. Committee for Medical Opportunities for Women, Dr. Sue Radcliff, Chairman, 21 Morris St., Yonkers, N. Y. Internships for Young

Graduate-Members of the M. W. N. A. in Hospitals Conducted by the American Woman's Hospitals; in Missionary Hospitals and in Hospitals in U. S. A., as well as Opportunities for private practice, Service on Boards of Health, Government Appointments, etc.

5. Publicity for the Medical Women's National Association through the Bulletin and an Editorial Staff Consisting of the President and Executive Committee, President-Elect and an Editor-in-Chief. Dr. Grace N. Kimball, Poughkeepsie, N. Y., was appointed Editor-in-Chief.

The Bulletin, which was published quarterly last year, will be continued as the Official Organ of the Association and sent to all members of the M. W. N. A.

An amendment to the Constitution was passed, providing for Group Membership. This was in response to proposals for Federation made last year by certain State societies of Medical Women. Under the Group Membership Amendment, organizations of women whose basis of membership conforms to that of the M. W. N. A., viz., Membership in the A. M. A., may join the National as Group Members: Kansas State Medical Women's Society; New York State Medical Women's Society; Connecticut State Medical Women's Society; Portland, Ore. State Medical Women's Club affiliated through their representatives at the San Francisco meeting.

The Nebraska, Los Angeles and New England Medical Women's Societies signified their desire to take action regarding affiliation.

The M. W. N. A. had a most interesting scientific and educational exhibit, at San Francisco, showing the work of the American Women's Hospitals in Greece and Serbia. Twenty hospitals and a large number of dispensaries are being run by this committee of the M. W. N. A. in Greece alone, under the directorship of Dr. Mabel Elliott, New York Headquarters, 637 Madison Ave., New York; Dr. Esther P. Lovejoy, Executive Secretary.

Four periods on the A. M. A. Moving Picture Theater were assigned to the National—a film of work in Greece, Crete and the quarantine Work on Macronesi Islands, shown by Dr. Esther Lovejoy; and slides of Hospital and Surgical work in Serbia, under Dr. Etta Gray.

Dr. Kate Campbell Mead, of Middletown, Conn., was installed as President. Dr. Katherine C. Manion, of Port Huron, Mich., was

chosen President-Elect. Other officers are: vice-presidents, Dr. Martha Welpton, San Diego, Dr. Marjory J. Potter, San Diego, and Dr. Florence W. Duckering, Boston, Mass.; secretary, Dr. Jessie W. Fisher, Middletown, Conn.; treasurer, Dr. L. Rosa H. Gantt, Spartanburg, S. C.

The 1924 annual meeting of the Medical Women's National Association will be held in Chicago, Ill.

The Truth About Medicine

In addition to the articles enumerated in our letter of May 29th, the following articles have been accepted:

Abbott Laboratories		
Amidopyrine-Abbott.		
Amidopyrine-Abbott Tablets, 5 Grains.		
Epinephrin Chloride Solution-Abbott.		
General Chemical Co.		
Sofos.		
Eli Lilly & Co.,		
Iletin (Insulin-Lilly)		
Iletin (Insulin-Lilly)	H-10:5	Cc. Ampules.
Iletin (Insulin-Lilly)	H-20:5	Cc. Ampules.
Powers-Weightman-Rosengarten Co.,		
Sulpharsphenamine Billon		
Sulpharsphenamine	Billon,	0.1 Gm. Ampules.
Sulpharsphenamine	Billon,	0.2 Gm. Ampules.
Sulpharsphenamine	Billon,	0.3 Gm. Ampules.
Sulpharsphenamine	Billon,	0.4 Gm. Ampules.
Sulpharsphenamine	Billon,	0.5 Gm. Ampules.
Sulpharsphenamine	Billon,	0.6 Gm. Ampules.

NEW AND NONOFFICIAL REMEDIES.

Insulin.—An aqueous solution of an active principle from pancreas which effects sugar combustion. The strength of insulin is expressed in "units," one unit being one-third of the amount required to lower the blood sugar below 0.045 per cent. and cause convulsions in a rabbit weighing 2 kg., which has been previously starved for twenty-four hours. The administration of insulin to diabetic dogs and to man in severe cases of diabetes mellitus restores to the body the lost ability to oxidize carbohydrate, and glycogen is again stored in the liver. If insulin is administered at suitable intervals to a person suffering from diabetes mellitus, the blood sugar is maintained at a normal level and the urine remains free of sugar. Fat is also burned and, as a result, ketone bodies do not appear in the urine and diabetic acidosis and coma are prevented. The administration of insulin is indicated in cases of diabetes mellitus which cannot be controlled satisfactorily by dietetic treatment. Overdosage of insulin is followed by the development of serious symptoms which demand immediate treatment. Insulin is administered subcutaneously one, two or three times a day before meals. The dosage required to reduce the blood sugar to the normal level must be established for each patient by determination of the blood sugar before and after administration of insulin. In cases of coma or severe acidosis, an initial dose of 15 or 20 units of insulin may be given, followed at 3 to 4 hour intervals by smaller doses with simultaneous administration of glucose.

Insulin-Toronto.—A brand of insulin. It is marketed in 5 Cc. vials containing 10 units in each Cc., and in 5 Cc. vials containing 20 units in each Cc. Connaught Antitoxin Laboratories of the University of Toronto, Toronto, Ontario, Canada.

Quinine Ethyl Carbonate.—The quinine ester of ethyl carbonic acid. Quinine ethyl carbonate was first introduced as euquinine. It is used in place of quinine sulphate and similar soluble quinine salts when a practically tasteless quinine compound is preferred.

Quinine Ethyl Carbonate—M. C. W.—A brand of Quinine Ethyl Carbonate—N. N. R. Mallinckrodt Chemical Works, St. Louis, Mo. (Jour. A. M. A., June 2, 1923, p. 1617).

Arsphenamine-Mallinckrodt.—A brand of arsphenamine—N. N. R. (See New and Nonofficial Remedies, 1923, p. 46). It is marketed in ampules containing, respectively, 0.1 Gm., 0.2 Gm., 0.3 Gm., 0.4 Gm., 0.5 Gm., 0.6 Gm. and 1.0 Gm. Mallinckrodt Chemical Works, St. Louis, Mo.

Barbital—M. C. W.—A brand of barbital—N. N. R. (See New and Nonofficial Remedies, 1923, p. 62). Mallinckrodt Chemical Works, St. Louis, Mo.

Cinchophen—M. C. W.—A brand of cinchophen—N. N. R. (See New and Nonofficial Remedies, 1923, p. 90). Mallinckrodt Chemical Works, St. Louis, Mo.

Mercuric Cyanide—M. C. W.—A brand of mercuric cyanide—N. N. R. (See New and Nonofficial Remedies, 1923, p. 194). Mallinckrodt Chemical Works, St. Louis, Mo., (Jour. A. M. A., June 16, 1923, p. 1775).

Iletin (Insulin-Lilly).—A brand of insulin. (See Jour. A. M. A., June 2, 1923, p. 1617). It is marketed in 5 Cc. ampules containing 10 units in each Cc. and in 5 Cc. ampules containing 20 units in each Cc. Eli Lilly & Co., Indianapolis, Ind. (Jour. A. M. A., June 23, 1923, p. 1851).

Amidopyrine-Abbott.—A brand of amidopyrine—N. N. R. (See New and Nonofficial Remedies, 1923, p. 250). It is marketed in substance and in 5 grain tablets. Abbott Laboratories, Chicago, Ill.

Epinephrin Chloride Solution—Abbott.—A solution containing epinephrine chloride, equivalent to 1 part of epinephrine in 1,000 parts of physiological solution of sodium chloride, preserved by the addition of benzoic acid and saturation with carbon dioxide. For a discussion of the actions, uses and dosage of epinephrine, see New and Nonofficial Remedies, 1923, p. 112. Abbott Laboratories, Chicago, Ill. (Jour. A. M. A., June 30, 1923, p. 1910).

PROPAGANDA FOR REFORM

Calcium Therapy in Tuberculosis.—From a review of the literature, Maver and Wells concluded that there is no convincing clinical evidence of the value of calcium administration in tuberculosis. They believe that no deficiency in blood calcium exists in tuberculous patients. From carefully controlled animal experiments these investigators conclude that calcium administration does not affect the course of tuberculosis in animals. If the use of calcium compounds in the treatment of tuberculosis is to be continued, clinical experiments of a scientific character should be conducted. At the present time there appears to be no scientific basis for the use of calcium in tuberculosis. (Jour. A. M. A., June 2, 1923, p. 1619).

Progress and Conservatism in Therapeutics.—The Committee on Therapeutics of the Council on Pharmacy and Chemistry has published a communication calling attention to two books which physicians should have—New and Nonofficial Remedies and Use-

ful Drugs. It is explained by the Committee that for eighteen years the Council has done its utmost to bring before the medical profession the truth concerning the new proprietary medicinal preparations which are being offered to the profession. The work and functions of the Council are discussed, and it is explained that while the Council was organized primarily to put a stop to the exploitation of proprietary medicines under false claims and the use of secret preparations, its activities have broadened until its work may now be characterized as a "propaganda for the rational use of drugs." The communication concludes: "New and Nonofficial Remedies" and "Useful Drugs" together furnish information concerning all drugs, old and new, which are at present essential to, or give promise of value in, the practice of medicine. They have been compiled with a special object in view, namely, to meet the needs of the student and practitioner of today. The report is signed by C. W. Edmunds, M. D., Professor of Materia Medica and Therapeutics, University of Michigan, Ann Arbor, Mich.; John Howland, M. D., Professor of Pediatrics, Johns Hopkins University, Department of Medicine, Baltimore, Md.; Ernest E. Irons, M. D., Ph. D., Associate Professor of Medicine, Rush Medical College, Chicago, Ill.; W. T. Longcope, A. B., M. D., Professor of Medicine, Johns Hopkins University, Department of Medicine, Baltimore, Md.; G. W. McCoy, M. D., Director Hygienic Laboratory, U. S. Public Health Service, Washington, D. C.; W. W. Palmer, B. S., M. D., Bard Professor of Medicine, College of Physicians and Surgeons, Columbia University, New York City; Francis W. Peabody, M. D., Professor of Medicine, Medical School of Harvard University, Boston, Mass.; L. G. Rowntree, M. D., Sc. D., Professor of Medicine, Mayo Foundation, Rochester, Minn. (Jour. A. M. A., June 2, 1923, p. 1635).

Book Announcements

International Clinics. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles by Leading Members of the Medical Profession Throughout the World. Edited by HENRY W. CATTELL, A. M., M. D., Philadelphia, with the collaboration of others. Vol. II. Thirty-Third Series, 1923. Philadelphia and London. J. B. Lippincott Company. This volume contains papers on Insulin, on Medical Diagnosis and Treatment, and Surgery. Cloth. 304 pages.

Recovery Record. For use in Tuberculosis. By GERALD B. WEBB, M. D., Consulting Physician Cragmor, Glocker, and Sunnyside Sanatoria; President Colorado School of Tuberculosis, Colorado Springs, Col., etc., and CHARLES T. RYDER, M. D. Colorado School of Tuberculosis, Colorado Springs, Col. New York. Paul B. Hoeber, Inc. 1923. 79 pages of text divided into four chapters, following which are 108 chart sheets. 12mo. Semi-flexible cloth. 195 pages (2 years' record), \$2.00 net. Postpaid on receipt of price.

Physiotherapy Technic. A Manual of Applied Physics. By C. M. SAMPSON, M. D., Formerly of the Physiotherapy Service, Walter Reed, U. S. A. General Hospital, Washington, D. C.; Formerly Chief of Physiotherapy Service and in Charge of Reconstruction Work at Several U. S. A. Hospitals. St. Louis. C. V. Mosby Company, 1923. 443 pages with eighty-five illustrations. 8vo. Cloth. Price \$6.50.

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Editorial

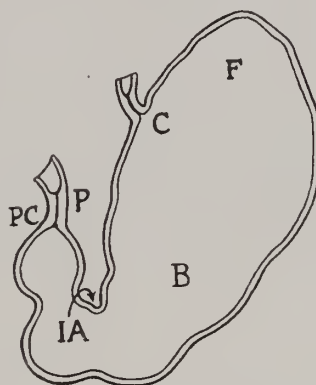
The Slow Emptying Stomach.

The stomach is the repository, for a brief period, of the swallowed food taken daily into the body. Upon this organ devolves the duty of mixing and dissolving this food, and initiating the processes of digestion of it and, more or less promptly, discharging it into the intestines. While it is important that ingested food products taken in daily shall remain in the stomach and receive the treatment of mixing and partial digestion, so necessary for its physiological breaking-down into assimilable elements, it is equally important that ingested food products shall not remain in the stomach for "too long a time." The stomach may be injured functionally by such a misuse of it.

The mechanism of stomach function is better understood as one recalls the anatomical divisions of it. The stomach is divided into the cardiac and the pyloric portion by an indentation in lesser curvature known as incisura angularis. The cardiac end is subdivided into the (1) fundus (that portion lying "north" of a line horizontally through the cardiac orifice), and into the (2) "body of the stomach" (that portion between the fundus and the incisura angularis). The pyloric end of the stomach is divided into three parts: (1) the pyloric vestibule, (2) the antrum, (3) pyloric canal.

The steps in the mechanical unloading of the filled stomach may be stated in this way. Peristaltic waves originate about the middle of the body of the stomach and travel toward the

pylorus. The fundus region remains free of peristaltic wave-movement, but is the seat of a tonic contraction which maintains a constant pressure upon the food-content, delivering it to the pylorus with a steady force until the fundus is empty. This motor phenomenon of the



Schematic outline of the stomach. At C is the cardia; F, fundus; IA, incisura angularis; B, body; PC, pyloric canal; P, pylorus. The antrum is the portion from IA to PC inclusive. (From Cannon.) (See Physiology and Biochemistry in Modern Medicine, Macleod.)

stomach is an essential one in the emptying of food into the intestines. Without adequate motor power the stomach fails to empty itself and the partially digested food undergoes a fermentative and putrefactive change in spite of its pepsin-hydrochloric acid digestion.

In connection with this one may briefly consider the control of the pyloric sphincter. It seems necessary to modify views elaborated by Cannon that the pylorus is controlled by the acidity of chyme alone. Now, it seems that the control of the pylorus rests upon the "magnitude of the antral contractions." Chyme passes into the duodenum during gastric contraction and coincides with the peristaltic waves traveling over the stomach. The waves in their course over the stomach show varying degrees of contraction and relaxation. The time elapsing between phases of relaxation in the wave is spoken of as a gastric cycle. Stomachs vary in gastric cycles. Some waves are one, two, three or four cycle types of gastric cycles. The four cycle is the most common type of peristalsis. A gastric cycle requires two to three seconds and a four cycle peristalsis requires eight to twelve seconds. When the peristaltic wave, beginning in the body of the stomach and traveling toward the pylorus, reaches the antrum, the sphincter relaxes and the contents are propelled into the pyloric opening. The sphincter relaxes in response to every peristaltic wave

arriving at the antrum and apparently does so blindly, without regard to the reaction of the gastric or duodenal contents, says Macleod, although, no doubt, other factors than peristalsis enter into the emptying of stomach chyme into the pylorus.

Wheelon and Thomas' work in connection with observations made on the relationship between the activities of the duodenum below the "reservoir cap" and the movements of the antrum and pyloric sphincter is interesting. It was found that the duodenum enters upon its positive phase two and a half seconds after the commencement of the sphincter contraction and at the moment the antrum relaxes. It remains relaxed throughout the sphincter and duodenal contractions.*

CONDITIONS INFLUENCING THE EMPTYING OF THE STOMACH.

It is known that the consistency of the foods does not have a very great effect upon the emptying of the stomach. Experiments upon the time required for certain foods to get out of the normal stomach show that there is considerable variation. For instance, the raw egg evacuates in a short time, in less than two hours, while the beef steak may be four hours in evacuating.

The presence of a considerable amount of gas, generated in stomachs as a result of dysfunction or indigestion of the food, and accumulating in cardia, markedly delays the emptying time of the stomach. This may result from the pneumatic pressure upon the stomach musculature which interrupts the peristalsis and eventuates in gastric atony, dilatation and ptosis.

The emptying time of the stomach is influenced by the secretory function indirectly but directly by the motor-function. The term atony applies to that want of power in the musculature to promptly and completely mix and evacuate food received in a normal meal. This condition is due, as above stated, to the failure of peristaltic waves arising in the body of the stomach and traveling to the pylorus, to generate enough force to empty the stomach of its contents. This is not ptosis. There may be and there usually is some dilatation of the organ, which results from the fatigue factor in muscle structure of the stomach wall. Hence,

we may have to deal with not only a slow emptying stomach (atonic) but also a dilated one. Such a stomach may, in addition to the factors of atony and dilatation, become displaced downward (ptosed). In such a fasting organ, the "succussion splash" is quite pathognomonic of ptosis without power to empty completely. The effort to make a line of delineation is of little practical importance, because in both instances the evacuating or emptying function is embarrassed and the organ is crippled.

The capacity of the stomach may be taxed by overloading. The meal may be a mixed one of meat, vegetables and sweets, with fluids. The stomach begins its peristaltic wave action in the body of the organ; the cardiac section fixes its muscular contractions upon its gas and fluid contents; slowly through the course of two to four hours, performing thousands of microscopic muscular contractions and four to five hundred expulsive wave contractions toward the pylorus, the mixed contents of meat, potato, salads, pies, sweets, coffee and what not, are gradually propelled toward and expelled through the pyloric outlet. So, continued and habitual overloading or dietary indiscretions begin to bring about a weary, atonic musculature. There may be and there usually is secretory disturbance also. Besides, there may be stomach atony with slow emptying function in patients suffering from general muscular weakness from long-standing general diseases, as anemia, syphilis, tuberculosis and diabetes mellitus; in persons who fail to take proper physical exercise or persons who lead sedentary lives.

Actual gastropptosis alone, without splanchnoptosis, is rare. But it does not matter whether or not the cardia actually leaves its upper attachments alone or in association with other viscera. The fact remains that the "deeps" of the stomach descend in such instances to the "pit" of the pelvis and the daily load placed in this reservoir is not evacuated or emptied, except tardily. This is the important desideratum. For it has been known that not all ptosed stomachs lack the power of evacuation. The position of the stomach is not the criterion for judgment of stomach function, but its power to evacuate its load is the real test of function. Physicians may look with keener interest upon the emptying function of the stomach as a measure for judging of its motor func-

*Macleod, pages 484-495. *Physiology and Biochemistry in Modern Medicine.*

tion rather than upon the location of the loaded organ.

INDICATIONS OF SLOW EMPTYING STOMACHS.

Delayed evacuation is indicated by the usual signs of gastric indigestion. Not enough attention is given to the complaints of so-called "dyspepsia." "Dyspepsia" means stomach misfunction. One of the earliest of these dysfunctions is tardy gastric evacuation. A slowing of gastric emptying kicks up discomfort. The appearance of eructations after taking a meal is a symptom of it. The cardia, ballooned with gas, indicates impaired gastric motility as it may gastric secretory disturbance. The sense of fullness and dragging over the upper abdomen, heart-burn, and regurgitation of food, point to impairment of physiologic action in the stomach and may be positive evidence of the delayed evacuation, associated possibly with chronic gastritis, gastric dilatation and gastric ptosis.

In connection with these signs there are frequently signs of systemic disturbance, such as dizziness, morning headache, mental sluggishness (biliousness), melancholia, insomnia and physical weakness. Such patients are rarely free of other and associated morbid processes, which may enter more or less into the etiology of the gastric dysfunction under consideration. From the history of "stomach cases," one may sense often the associated pathology. Is it not singular how true to form the story of "gastric ulcer," "gastric cancer," "gastritis," "gall tract," and "the appendix" case comes out in the "bill of complaints?"

Every history that suggests the signs of gastric pain, nausea, heart-burn, belching, heaviness, oppression, and cardiac or respiratory disturbances following a meal, should receive a careful consideration from the point of view of gastric function and its associated early and late morbid pathology. Every "chronic stomach case," as every "chronic eye case," or other sort of chronic case, should be carefully studied as a whole. The patient should receive, if possible, a systematic general physical examination. This should be done with the patient in position for such complete general physical examination that is free of the encumbrance of clothing, with all due regard for the amenities of life, particularly modesty. Clothing, and the failure to use a good head mirror, or a good light, is often the cause of the errors of diagnosis. A body carefully inspected "from head

to foot," by an observing physician, is very much more liable to receive accurate judgment than one covered or only seen in sections. An examination in standing position is as important as one in the recumbent position.

Indications of a slow emptying stomach are readily confirmed by the stomach tube and X-ray examinations, as well as by inflation of the stomach with gas, with a Seidlitz powder, or by eliciting the succussion splash of a so-called "fasting stomach." If a stomach, for instance, six hours after an average meal, gives such evidence of immobility as the production of the splashing sound, referred to, one may conclude that there is evidence of improper function.

INTUBATION.

The introduction of a tube into the stomach is not difficult. It is not done often enough. The patient is often at fault, because few people there are who do not dislike the thought of "gagging" and nausea. Such an attitude subconsciously reacts upon the practitioner. The examination of the stomach contents, either after the so-called *test meal* has been given or the contents of a stomach that has been fasting for six hours, often may give evidence of the nature of the stomach complaint before gross morbid anatomy has been established. Were intubation done oftener in cases of "dyspepsia" or stomach cases, the probabilities are that the gross and terminal pathology with which we have to deal now would be prevented. The ideal method for the study of gastric function is by the fractional gastric method. This small tube tip can be "swallowed" easily. The patient, with a little instruction, can readily swallow the tube and "feed" it into the stomach. The material obtained should be examined as to (1) quantity; (2) length of time in the stomach; (3) degree of digestion, early and late; (4) the color, odor, general appearance of samples at various aspirations during the intubation; (5) total acidity, free acidity; (6) food retention; (7) microscopic examination; (8) blood; (9) pus; (10) mucus; (11) bile; (12) bacteria.

In the field of motor function of the stomach, one should remember that the Ewald test is evacuated, *in health*, in two to two and a half hours. In other words, an Ewald test meal should not get out of the stomach before two hours, or after two and a half hours after taking. If evacuated in an hour and a half,

there is hypermotility, and, if retained more than two and a half hours, there is hypomotility, or slow emptying power.

As one recalls the grouping of hypermotility cases into (1) achylia gastrica, (2) scirrhus carcinoma with patulous pylorus, (3) a small proportion of cases of duodenal ulcer, (4) those due to function (nervous) hyperperistalsis incident to examination, so one must classify the hypomotility cases in two general groups: (1) association with early digestive disturbances (dyspepsia and those with muscular atony, dilatation and ptosis), (2) true obstruction—blocking pathology.

News Notes

Virginia State Board of Medical Examiners.

At the June meeting of the Board, in Richmond, sixty-six doctors were licensed to practice in this State, fifty-seven by examination and nine by reciprocity. It is announced that this is the largest number to be licensed by the Board since 1914.

Those licensed by examination are:

Dr. Bolling Jones Atkinson, Johnston-Willis Sanatorium, Richmond.

Dr. Emerson M. Babb, Stuart Circle Hospital, Richmond.

Dr. W. H. Batte, Jr., Retreat for Sick, Richmond.

Dr. Benj. F. Bailey, Ft. Defiance, Va.

Dr. Wyatt S. Beazley, Jr., St. Francis Hospital, Jersey City, N. J.

Dr. John A. Blakeney, New York City.

Dr. Wm. P. Bittinger, Johnston-Willis Sanatorium, Richmond.

Dr. Jos. E. Burns, City Hospital, New York City.

Dr. E. P. Cardwell, Wilmington, N. C.

Dr. William E. Chapin, Richmond.

Dr. Fielding Combs, City Hospital, New York City.

Dr. John G. Davis, Jr., Roanoke, Va.

Dr. Saml. W. Eason, Jersey City Hospital, Jersey City, N. J.

Dr. Monroe Jacob Epting, Jr., St. Luke's Hospital, New York City.

Dr. Richard T. Ergenbright, City Hospital, Worcester, Mass.

Dr. Rowland H. Edwards, Memorial Hospital, Richmond.

Dr. Percy R. Fox, Retreat for Sick, Richmond.

Dr. Benjamin E. Glass, Muhlenberg Hospital, Plainfield, N. J.

Dr. Samuel J. Goldfain, Richmond.

Dr. Joseph T. Graham, St. Luke's Hospital, Richmond.

Dr. W. S. Grambling, Craig Healing Springs, Va.

Dr. Benjamin F. Haskell, Philadelphia.

Dr. Frank E. Handy, Toms Creek, Va.

Dr. Rogers N. Harris, St. Luke's Hospital, Richmond.

Dr. Robt. P. Hawkins, Jr., C. & O. Hospital, Clifton Forge, Va.

Dr. Frank Helvestine, Jr., Roanoke, Va.

Dr. Robt. Battaile Hiden, Pungoteague, Va.

Dr. Clack D. Hopkins, Flushing Hospital, New York City.

Dr. Humie Z. L. Horton, Apex, N. C.

Dr. Wm. B. Hubbard, Broadway, Va.

Dr. Robt. S. Kyle, Woodlawn, Va.

Dr. Estes Caskie Kidd, Nelson County, Va.

Dr. Robt. Bruce Lawrence, Richmond.

Dr. Lee S. Liggan, Memorial Hospital, Richmond.

Dr. Eugene L. Lowenberg, Lenox Hill Hospital, New York City.

Dr. Homer B. Luttrell, Amissville, Va.

Dr. Thomas Hodge McGavach, Waterford, Va.

Dr. John A. Mease, Jr., Memorial Hospital, Richmond.

Dr. John W. McNabb, Belleville, Pa.

Dr. Henry H. Menzies, Retreat for Sick, Richmond.

Dr. Edwin Raymond Mickle, Philadelphia General Hospital, Philadelphia.

Dr. Phil Hawkins Neal, Gouverneur Hospital, New York City.

Dr. Waverly R. Payne, Elizabeth Buxton Hospital, Newport News, Va.

Dr. Clarence E. Perkins, Northwestern General Hospital, Philadelphia.

Dr. Louis Perlin, Memorial Hospital, Richmond.

Dr. Fred F. Oast, Portsmouth, Va.

Dr. Miles P. Omohundro, Charlottesville, Va.

Dr. William I. Owens, Lenox Hill Hospital, New York City.

Dr. Russell W. Roberts, Faber, Va.

Dr. J. Churchill Robertsen, Long Island Hospital, Brooklyn, N. Y.

Dr. Harry T. Schiefelbein, New Libson, Wis.

Dr. David L. Strader, St. Charles, Va.

Dr. Leta J. White, Memorial Hospital, Richmond.

Dr. Ernest M. Wilkinson, Stuart Circle Hospital, Richmond.

Dr. John Powell Williams, St. Luke's Hospital, New York City.

Dr. Richard L. Willis, New York City.

Dr. Archer A. Wilson, Oxford, N. C.

Those licensed by reciprocity are:

Dr. Nat. H. Copenhaver, Rochester, Minn.

Dr. Francis A. Georger, Warrenton, Va.

Dr. Hannes Inberg, Warren, Ohio.

Dr. Kenneth E. Lowman, Norfolk, Va.

Dr. Seab A. Tuck, Eggleston, Va.

Dr. George Penn Dillard, Draper, N. C.

Dr. Walter L. Hogan, New York City.

Dr. George Richardson Joyner, Suffolk, Va.

Dr. Thos R. O'Rourke, Norfolk, Va.

Ladies Especially Invited to Attend the Meeting of the State Medical Society Which Will be held in Roanoke, October 16th-19th.

The Entertainment Committee wishes particularly to announce that an especial feature of the meeting of the State Medical Society this year will be plans for the entertainment of the ladies.

It will be recalled that a Ladies' Auxiliary was organized at the Norfolk meeting with Mrs. R. L. Williams of Norfolk as President and Mrs. Sparrell Gale of Roanoke as Vice-President. It is planned that as a preliminary to the future activities a meeting of the Auxiliary will take place at Hotel Roanoke on Wednesday morning, the second day of the meeting of the Society.

The Ladies' Entertainment Committee of Roanoke are at present busy with tentative plans which, among other things, include visits to points of interest in and around Roanoke, such as Hollins College, Virginia College, Roanoke College, a trip up the Mill Mountain Incline, and last but not least a trip to the Catawba Sanatorium, and a barbecue and entertainment at Lakeside.

The officers of the State Board of Health and of the Sanatorium have been good enough to include all members of the Society and visiting ladies in the invitation to visit Catawba. Likewise Dr. Everett Watson of Salem has kindly invited all to visit and inspect Mt. Regis Sanatorium.

It is now planned that early in the afternoon of Wednesday, following the Scientific program of the morning, automobiles will leave

Roanoke by the way of Salem, visiting Mt. Regis and going directly to Catawba. A splendid macadam road is now nearing completion the entire distance which, as those who have previously made the trip will attest, leads through beautiful and rugged mountain scenery which will be at its best in October.

If it be found agreeable to the Scientific Program Committee, it is planned to group such papers as may deal with Tuberculosis and kindred subjects and present them at the Sanatorium along with such demonstrations and other matters of interest as doubtless will be presented by the physicians of the Sanatorium.

Dinner will be served at the Sanatorium in ample time for the return trip to Roanoke and the resumption of the Scientific Program of the evening, following which a dance will be tendered.

While the complete plans for the barbecue and entertainment at Lakeside on Thursday have not been worked out, the Committee promises that it will not be lacking in features of interest. Following the barbecue the ladies will be entertained by a musical at the Country Club.

Ladies make your plans to come to Roanoke and enjoy a splendid outing!

Open Letter to the Doctors of Virginia.

1110 Capitol Street,

Richmond, Va.,

July 27, 1923.

There have been in Virginia a large number of cases of illness presenting the following characteristics:

Acute onset with severe epigastric pain which may extend later to one or both sides of the lower portion of the thorax. The pain is described as very severe, as cutting or as cramp-like. The pain is increased by deep breathing so respiration is shallow and rapid. A rate of 60 per minute has been noted. An expiratory grunt is frequently observed.

The temperature is usually 100 and 102, pulse 80 to 100. The patient looks very ill. The face is pinched or moderately cyanosed.

Constipation is the rule and abdominal distention is frequent.

The most severe symptoms are at the time of onset and last from four to twenty-four hours. The duration of acute illness is seldom more than five days but slight elevation of temperature may continue for three weeks.

The condition affects children and adults but is more common in the former. It spreads through families in the manner of a contact infection. There have been no deaths but a few cases have been followed by serious illness of some other type.

The condition is apparently an undescribed communicable disease now occurring as an epidemic. This description is issued so that you may be on the lookout for it in your practice. If it occurs or has occurred in your practice, please notify us of the number of cases and the date when your first case was seen.

ENNION G. WILLIAMS, M. D.

State Health Commissioner and Collaborating Epidemiologist, U. S. P. H. S.

Attention, Doctors!

The above communication from the State Health Commissioner, Dr. Ennion G. Williams, explains itself. As a matter of interest to the profession, in addition to reporting your cases, as requested by Dr. Williams, it will be helpful to have an expression of opinion from our readers as to their treatment of these cases, with results obtained.

Re-Organization of the Professional Activities of the Free Dispensary and the Hospital Division of the Medical College of Virginia.

The Medical Staff of the Hospital Division of the Medical College of Virginia was completely reorganized during September, 1922, and the professional activities in the Dooley Hospital for white children under ten years of age, the Memorial Hospital for the white patients over ten years of age, and the Saint Philip Hospital for negro patients, which hospitals are owned and controlled by the Medical College of Virginia, have been carried on by the reorganized Medical Staff, since that time. The Medical Staff is organized in the following manner:

The Administrative Committee of the Medical Staff comprises the Dean of the Faculty of the School of Medicine as Chairman, the Superintendent of the Hospital Division as Secretary, and the following professors of the School of Medicine of the College who, co-incident with their election, are appointed by the Executive Committee of the Board of Visitors as heads of the departments indicated: Professor of Medicine as Physician-in-Chief; Professor of Surgery as Surgeon-in-Chief; Pro-

fessor of Obstetrics as Obstetrician-in-Chief; Professor of Pathology as Pathologist; Professor of Roentgenology as Roentgenologist.

The Administrative Committee of the Medical Staff meets once each week at the Memorial Hospital, and thoroughly canvasses and discusses the various professional activities carried on in the Hospital Division. It is empowered to make, promulgate and enforce rules and regulations governing the professional and teaching work in the Hospitals, subject to the approval of the Medical Staff.

The Medical Staff is selected from the Faculty of the School of Medicine of the College, and is elected annually in June by the Executive Committee of the Board of Visitors. The personnel is nominated by the Chiefs of Departments represented on the Administrative Committee of the Medical Staff, upon the recommendation of the heads of the various divisions and services established in the Hospital Division, who are the heads of corresponding Divisions on the faculty of the School of Medicine of the College. They are known as Physicians and Surgeons, and Associate Physicians and Surgeons.

The Assistant Medical Staff is selected from the faculty of the School of Medicine of the College, and is elected annually in July by the Executive Committee of the Board of Visitors upon the recommendation of the Medical Staff. They are known as Junior Physicians and Surgeons.

The medical and surgical treatment of patients occupying beds in the wards of the hospitals, irrespective of whether their expenses are paid by the City, by the State, or by themselves, is directed and supervised by the group from the Medical Staff organized for that purpose. Physicians and surgeons are not permitted to charge or receive a fee or emolument for services rendered to Ward Patients, and arrangements have been made to accommodate in private rooms at a moderate charge patients debarred from the Wards on account of this ruling. Patients occupying beds in the Wards of the Hospitals, who are able to pay for the care and treatment rendered, are charged \$2.50 per day, which is in full for all examinations and treatment necessary, there being no extra charges whatever.

All reputable physicians and surgeons in Richmond have full privilege to treat patients occupying private rooms in any of the hos-

pitals, including the use of the operating rooms.

On July 1, 1923, the Free Dispensary, heretofore maintained by the Medical College of Virginia as a separate department, became the "Out-Patient Department" of the Hospital Division, and its affairs both administrative and professional will from that time on be directed and supervised by the officials of the Hospital Division. The Medical Staff of the Out-Patient Department will be selected from the personnel of the Medical Staff and Assistant Staff of the Hospital Division. Appointment on the Medical Staff and Assistant Staff of the Hospital Division carries with it an obligation to serve on the Medical Staff of the "Out-Patient Department" in the corresponding Division or Service. This will bring about a closer co-ordination of the work of caring for and treating patients in the various Departments, as physicians and surgeons treating patients in the Hospitals may, on the discharge of the patient from the Hospital, refer the patient to the Out-Patient Department for continued observation and minor treatment, under their direction and supervision. Likewise, patients applying to the Out-Patient Department for treatment, and requiring to be admitted to the Hospital, may be observed and in many instances treated by the physician or surgeon first seeing the patient in the Out-Patient Department.

Included in the program of enlargement of the Medical College of Virginia is a building seven floors in height, the first three floors to be used exclusively by the Out-Patient Department, and the other four floors to be used by the Pathological Laboratory and related activities.

Woman's Auxiliary.

Members of the Woman's Auxiliary of the Medical Society of Virginia will be much interested in the report given on page 335, this issue, by their delegate, Mrs. J. Allison Hodges, of Richmond. Only three of our Virginia members were represented at the San Francisco meeting of the National Woman's Medical Auxiliary, but we count on larger attendance next year, as the members of the Virginia Auxiliary become more interested in the work.

In San Francisco, entertainments were arranged for the ladies every day and these, with the many points of interest to be visited, added very greatly to the enjoyment of those

who attended. The crowning event, perhaps, was the visit to the beautiful Stanford University, including the organ recital and the reception at the home of President and Mrs. Ray Lyman Wilbur.

Report on Alcoholism in Virginia.

Dr. W. A. Plecker, Director of the Virginia Bureau of Vital Statistics, replying to an inquiry from the World League Against Alcoholism, London, as to the effect from a medical standpoint of prohibition in this country, states that much good has already been accomplished since the State prohibition law went into effect. Without reference to the improvement in the moral conditions among the working class, there has been a gradual but very decided decrease in deaths from cirrhosis of the liver, showing that chronic alcoholics are gradually decreasing. The chief reason for the present number of deaths attributed to alcohol "is that the stuff now being sold for whiskey is not whiskey, and would have by no means passed the test of former years." The number of deaths in Virginia from alcoholism in 1922 was forty-nine. The first year after the prohibition law went into effect in Virginia (1917), the number of deaths from alcoholism was only twenty, as compared with sixty the preceding year.

Dr. Irving S. Barksdale,

Son of Dr. George E. Barksdale, formerly of Richmond, but now connected with the U. S. Veterans' Hospital, at Oteen, N. C., has been elected professor of physiology in the Medical College of South Carolina, at Charleston. He will enter upon his duties the first of September. Dr. Barksdale graduated from Yale University School of Medicine this year, and his appointment is the indirect result of some research work he has done in the field of medicine. Dr. Barksdale has quite a war record, having seen service on the Mexican border and later in the World War.

Dr. R. M. Gilliam,

Formerly of Newport News, Va., and a graduate of the Medical Department of the University of Virginia in 1919, has been on a visit to Williamsburg, Va.

Dr. and Mrs. R. A. Vonderlehr

Have returned to their home in Richmond, after a visit to friends in Heathsville, Va.

Dr. T. C. Harris,

Recently of Kenbridge, Va., has located in Martinsville, Va., where he is associated with Dr. M. E. Hundley at the Lucy Lester General Hospital.

Dr. Jury B. Loving,

Upon completing his internship at St. Luke's Hospital, Richmond, the first of July, located at 636 North Main Street, Danville, Va.

Dr. William H. Batte, Jr.,

Jarratt, Va., is serving as one of the internes at Retreat for the Sick, Richmond. He is temporarily taking the place of Dr. Samuel P. Hileman, of Rockbridge Baths, who has been quite sick at his home, with meningitis. Both of these doctors graduated from the Medical College of Virginia this June.

Dr. M. Grove-Hagen,

Richmond, left the first of July for a visit to his former home in Norway. He expects to be back about the first of September.

Dr. Ramon D. Garcin,

Richmond, has been named one of the trustees of the Grand Chapter, Royal Arch Masons of Virginia.

Dr. Garcin has also been recently elected a member of the public library board of Richmond.

Dr. and Mrs. A. T. Finch,

Of Chase City, Va., recently attended the reunion of the Bacon family in North Carolina.

Dr. Robert S. Spilman,

Medical officer of the Virginia Military Institute at Lexington, has been the guest of his sisters at their home near Warrenton, Va.

Dr. S. S. Northington

And several friends of South Hill, Va., spent a week in July on a fishing trip at Ocean Park.

Dr. and Mrs. R. L. Hudgins

And little daughter of Farmville, Va., have been among the summer visitors at Virginia Beach.

Dr. M. D. Arcy Magee,

Washington, D. C., after spending several months abroad, will return home the latter part of September.

Dr. E. L. Flanagan,

Richmond, has returned from New York where he was engaged in post-graduate work in X-ray. He will shortly open offices in the Medical Arts Building.

Dr. William A. McGowan,

Richmond, has been elected a member of the board of directors of the Federal Trust Company, of this city.

Former Virginian Awarded Croix De Guerre.

Information has been received here stating that Dr. Lewis S. Herndon, formerly of Richmond, has been awarded the French Croix de Guerre, with a gilt star. The reward comes as the result of heroic care for the wounded near Soissons, in 1918.

Dr. Herndon graduated from the Medical College of Virginia in 1914 and, after a few months in North Carolina, located in Virginia until he entered the World War. He returned to this country after eighteen months' service, during which time he was wounded, and took post-graduate work at Manhattan and Lying-In Hospitals, New York City. He was for twelve months head of the house staff of the latter hospital. About a year ago he located in Newark, N. J., where he is now specializing in obstetrics.

Dr. and Mrs. John D. Foltz

And children have returned to their home in Richmond after a visit to Buckroe Beach and Ocean View, Va.

Insulin Clinics.

To meet the demand for the insulin treatment of diabetes, special clinics are being held in hospitals in a number of the larger cities in the United States and Canada, to teach physicians in general practice the proper methods of employing the treatment. This instruction is made possible by a large donation by Mr. John D. Rockefeller, Jr.

Chiropractors Must Pass State Board Examination.

We note from the *Journal of the A. M. A.* that chiropractors and other "drugless" practitioners, graduates of mechanotherapy schools, will be granted certificates to practice in the State of Alabama, provided they pass an examination given by the State Medical Examining Board. New regulations require that ap-

plicants be examined in certain branches, among which are anatomy, chemistry, physiologic chemistry, bacteriology and pathology.

Dr. Samuel Newman

Has returned to his home in Danville, Va., and opened offices in Arcade Building. He will limit his practice to diseases of infants and children. Dr. Newman served abroad for twenty months as a member of the Medical Commission of the American Joint Distribution Committee in Poland, Galicia and Ukraine, and for ten months as Volunteer Physician in the Children's Clinic of the University of Vienna.

The American Association of Obstetricians, Gynecologists and Abdominal Surgeons

Will hold its next annual meeting in Philadelphia, September 19, 20 and 21, 1923.

Maj. Herbert C. Mallory, M. C.,

Has been relieved from duty with the Eightieth Division, organized reserves, at Richmond, Va., and will sail from San Francisco, October 23, for the Hawaiian Islands, where he will report to the commanding general of that department for duty with the medical corps.

Department Surgeons for Sons of Confederate Veterans, A. N. V.

Drs. Benjamin L. Hume, Huntington, W. Va., E. Ackley Moore, Marshall, Va., and Lawrence T. Price, Richmond, are among those who have been appointed department surgeons in the Army of Northern Virginia. Sons of Confederate Veterans.

Professor of Pediatrics, University of Virginia.

Dr. Lawrence T. Royster, Norfolk, Va., was elected professor of pediatrics in the University of Virginia, Department of Medicine, at a special meeting of the university board of visitors, held July 13. Dr. Royster will assume his new duties about the first of January, 1924. This is the first time the University of Virginia has had a full time professor of pediatrics, this branch having been included in the course of medicine.

Dr. Royster is recognized as one of the prominent pediatricians of the South and is a member of the American Pediatric Society. He is an alumnus of the University of Vir-

ginia, having graduated from its Medical Department in 1897. He will be greatly missed in Norfolk, where he has done a great deal of work in the children's clinics in addition to his private work.

Sanitary Inspectors Trained at the University of Virginia.

The first ten weeks' intensive course for Sanitary Inspectors, held at the University of Virginia, was completed on May 1st. Those completing the course were Miss Mary Lee Helms, of Blacksburg, Va., John Walton Robertson, of Charlotte Courthouse, Va., and Philip Kime, of Salem, Va. All of these students have been appointed to positions as County Sanitary Inspectors, Miss Helms being located at Lebanon, Russell County, Mr. Robertson at Chincoteague Island, Accomac County, and later transferred to Loudoun County, and Mr. Kime having worked for some months in Albemarle County has been transferred to Greene County to control an epidemic of dysentery. All these workers are filling good positions, and their work has been highly commended.

The University of Virginia is offering twelve weeks' intensive course for the training of Health Officers and ten weeks' course for Sanitary Inspectors. These courses are almost entirely of a practical nature and are conducted in the field, the plan being to give as much practical training as possible in the time required so that those taking the courses can best serve the needs of the State.

Dr. Walter E. Vest,

Huntington, W. Va., in July visited Williamsburg, Va., where he attended a meeting of the board of managers of the William and Mary Alumni Association, of which he is a member.

The Southwestern Virginia Medical Society

Will hold its fall meeting in Abingdon, September 6 and 7. The president, Dr. R. H. Woolling, Pulaski, will deliver his annual address and a most interesting program on medical and surgical subjects has been prepared. A subscription banquet will be held on the evening of the 6th. Dr. E. G. Gill, Roanoke, is secretary-treasurer of this Society.

Dr. Everett A. Lockett,

Winston-Salem, N. C., has been appointed

county physician for Forsyth County, North Carolina.

Dr. Joseph L. Spruill,

Recently of the staff of the N. C. Sanatorium for the treatment of Tuberculosis, at Sanatorium, N. C., beginning September 1, will have charge of the Guilford County (N. C.) Hospital for the Tuberculous.

Dr. and Mrs. C. V. Montgomery,

Family and some friends, of South Hill, Va., have returned home after a motor trip through the Valley of Virginia.

Dr. and Mrs. I. K. Briggs,

South Boston, Va., are home again after a motor trip through New England.

The Sixth (N. C.) District Medical Society,

At its meeting in July, elected Dr. Eric A. Abernethy, Chapel Hill, president, and re-elected Dr. Burton W. Fassett, Durham, secretary.

The American Therapeutic Society,

At its annual meeting in San Francisco, the latter part of June, elected Dr. George H. Evans, San Francisco, president, Dr. Lewis H. Taylor, Washington, D. C., secretary, and Dr. Spencer L. Dawes, New York City, treasurer. Both of the latter were also elected to serve five-year terms on the council.

Dr. and Mrs. Raymond C. Hooker,

Richmond, have been enjoying a motor trip through several of the Southern states.

The American Psychiatric Association,

At its annual meeting in Detroit, the latter part of June, selected Atlantic City, N. J., as the 1924 place of meeting. Dr. Thomas W. Salmon, Larchmont, N. Y., professor of psychiatry at Columbia University, New York, was elected president; Dr. William A. White, Washington, D. C., vice-president; and Dr. Clarence Floyd Haviland, Albany, N. Y., secretary-treasurer.

New State Health Commissioner of New York.

Dr. Mathias Nicoll, of Albany, has been appointed New York State Commissioner of Health, to succeed Dr. Hermann N. Biggs, who died from broncho-pneumonia on June 28. Dr. Biggs was one of the pioneer health workers

of this country. Dr. Nicoll has been with the New York State Health Department for the past eight years and for the past four years has been Deputy Commissioner. Prior to that time he was secretary of the department and director of Public Health Education.

Dr. James O. Mathews,

Clinton, N. C., has returned home after several weeks in New York where he was doing post-graduate work. Dr. Mathews has many friends in this section, having graduated from the University College of Medicine, Richmond, 1897. He states that he lives on a farm and is doing a real country practice.

Dr. O. O. Ashworth

Has opened offices in Suite 701, Professional Building, Richmond, for the practice of general medicine. He will move to the Medical Arts Building when it is completed.

Dr. Ashworth was for two years an interne at St. Elizabeth's Hospital, Richmond, and for the past year has been assistant physician at Catawba Sanatorium, Va. He has recently been appointed assistant attending physician to St. Elizabeth's Hospital, Richmond, Dr. William H. Higgins being attending physician and head of the Medical Department there.

Dr. and Mrs. Hugh McGuire,

Alexandria, Va., left the latter part of July for a visit of some length in Nova Scotia.

Dr. Hubert L. Wyatt,

Petersburg, Va., has resigned as a member of the medical corps, Virginia National Guard, for business reasons.

Dr. Hunter McGuire,

Richmond, recently spent several weeks with a patient at Saranac, N. Y.

Dr. and Mrs. Joseph Hume

And daughter, of Norfolk, Va., motored to Old Sweet Springs, W. Va., early in August, to spend the remainder of the summer at that place.

Dr. and Mrs. Thomas J. Kagey,

Newport News, Va., are spending several weeks visiting Alaska.

Dr. Sidney Trattner

Has returned to his home in, Richmond after a visit to New York.

Dr. and Mrs. E. H. Terrell

And daughters, Richmond, are spending some time at Wrightsville Beach, N. C.

Richmonders hurt in Motor Accident.

Dr. Thomas E. Hughes, of Richmond, his brother, Dr. John M. Hughes, a dentist of this city, and their mother suffered a number of bruises and cuts in an automobile collision near Boonsboro, Md., early this month. In spite of their injuries, however, they were able to proceed with their trip.

Dr. P. L. Hill, Jr.,

Of the class of '17, Medical College of Virginia, who has been engaged in medical missionary work in Choonchun, Korea, for the past six years, is now on a furlough in this country. At present he is taking a special course in diseases of the spine at Battle Creek Sanitarium. Dr. Hill expects to return to Korea about the first of December.

Aid to Authors.

To those who are preparing or contemplating the preparation of manuscripts, the information given in the advertisement of the Corona Typewriter, in this issue of the Journal, may prove of interest and service.

By the way, why not look over our advertising pages every month? You will find many things of interest constantly.

Dr. and Mrs. J. N. Elder,

Hopewell, Va., have been on a visit to Mrs. Elder's relatives in Christiansburg, Va.

Dr. Sam Wilson

Returned to his home in Lynchburg, Va., the first of this month, after a visit to his mother in Petersburg, Va.

Acting Health Officer in Petersburg.

Dr. Mason Romaine has been acting as city health officer of Petersburg, Va., during the absence from the city of Dr. R. A. Martin, who has been undergoing treatment at a Richmond hospital.

Dr. Powell Graham Fox,

Who recently completed his term of service as an interne at the Retreat for the Sick, Richmond, has located at 310 Masonic Temple, Raleigh, N. C., where he is engaged in general practice.

Dr. J. B. Dalton,

Richmond, announces the removal of his of-

fices and residence to 1100 West Franklin Street, this city. He has just completed a very attractive building at this place.

Southern Medical Association Meeting.

Plans are being made for a "big" meeting of the Southern Medical Association in Washington, D. C., November 12-15, inclusive, under the presidency of Dr. W. S. Leathers, of University, Miss. The New Willard Hotel will be general hotel headquarters, though the various sections will hold their meetings in other hotels. Mr. C. P. Loran, secretary-manager of the Association, Empire Building, Birmingham, Ala., will gladly furnish any information requested about this meeting.

Dr. W. E. Dickerson,

A graduate of the Medical College of Virginia in 1922, upon completing his internship at Retreat for the Sick, Richmond, in July, located in Danville, Va., with offices at 563 Main Street.

Dr. George H. Snead,

Of Fork Union, Va., leaves on the 20th of August for New York City, where he will take a post-graduate course in diseases of the eye, ear, nose and throat.

Dr. F. J. Clements,

Cartersville, Va., who graduated from the Medical College of Virginia this June, has located at Fork Union, Va., where he has taken over Dr. Snead's work.

"Have a Health Examination on Your Birthday."

With the above slogan the National Health Council is sponsoring a country-wide campaign for periodic health examinations. The movement has the endorsement of the American Medical Association. A committee of the A. M. A., has prepared forms which may be obtained at cost price from the Association headquarters, 535 N. Dearborn Street, Chicago.

The National Health Council, 370 Seventh Avenue, New York City, has prepared a pamphlet for distribution to the public, two excellent posters, a set of thirty lantern slides with lecture outline included, and a moving picture film. With the exception of the latter, which is available for free distribution, all of the other material is sold at cost price.

The U. S. Civil Service Commission.

Washington, D. C., announces open competitive examination for medical assistant in pharmacology, receipt of applications to close September 11. The examination is to fill a vacancy in the Bureau of Chemistry, Department of Agriculture, and similar positions, at entrance salaries ranging from \$3,000 to \$3,600 a year.

Applications will be received by the Commission until December 28, for graduate nurse and graduate nurse follow up, to fill vacancies in the Veterans' Bureau and in the Indian and Public Health Services. Competitors will not be required to report for examination at any place, but will be rated on their education, training, and experience, on a scale of 100.

For detailed information apply to the above named Commission.

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Obituary

Dr. Arlington Cecil Jones,

A beloved and prominent physician of Covington, Va., died at his home in that place, July 15, after a lingering illness with Bright's disease. He was born at Doe Hill, Va., in 1871, and, after an academic course at Virginia Polytechnic Institute, studied medicine at the University of Virginia, from which he graduated in 1894. He then served for four years as demonstrator of anatomy at the University of Virginia. In 1899, he located in Covington. He had been a member of the Medical Society of Virginia since 1899. He is survived by his wife, two sons, his father, Dr. H. H. Jones, of Dunmore, W. Va., and a large family connection.

Dr. William Alexander Wilson,

A prominent and beloved physician and citizen of Radford, Va., died June 22, after a long illness, and was buried in Christiansburg. He was born in Pulaski County, Virginia, 71 years ago and studied medicine at the University of Virginia, from which he graduated in 1874. While at the University, he was award-

ed the medal in chemistry. After this, he practiced for a while with his father, the late Dr. M. A. Wilson, in Puaski. He ministered to the sick in Radford for the past thirty-five years, and had always taken an active part in the civic affairs of the community. He had been a member of the Medical Society of Virginia for a number of years. Dr. Wilson is survived by his wife and one daughter, Mrs. J. L. Early, of Saltville, Va.

Dr. George W. Richards,

Of Island Ford, Va., died August 4, at the age of ninety-six years. He was a graduate of the Medical College of Virginia in 1857, and served as a surgeon with the Confederate army throughout the war between the states. He practiced his profession in East Rockingham and Albemarle Counties for more than fifty years.

Dr. James Reid Sterrett,

Durham, N. C., died June 10, following an operation for abscess of the lung. He was forty-two years of age and a graduate of the University College of Medicine, Richmond, in 1908, at which time he was appointed interne at Richmond City Hospital. He was at one time county physician for Durham County, North Carolina. Dr. Sterrett practiced for several years in Rockbridge County, Virginia and, during his residence in this State, was a member of the Medical Society of Virginia.

Dr. Jacob Andrew Keck

Died at his home in Richmond, Va., July 26, after a long illness. He was forty-eight years of age and studied medicine at the Medical College of Virginia, from which he graduated in 1895. He was at one time a member of the Medical Society of Virginia.

Dr. William B. Pryor Jones,

A well known homeopathic physician of Petersburg, Va., died July 15. He received his medical degree from Hahnemann Medical College and Hospital of Philadelphia in 1884.

Irvine Cooper, Ph.G.,

Of Norfolk, Va., a member of this year's graduating class in pharmacy at the Medical College of Virginia, was fatally wounded on August 5, when a revolver which was being cleaned accidentally discharged. He died a few hours later, after absolving the man handling the revolver of all blame for the accident. The bullet penetrated his back and emerged through the abdomen.

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Fifty-fourth Annual Meeting, Roanoke, October 16-19, 1923.

Vol. 50, No. 6.
WHOLE No. 855.

RICHMOND, VA., SEPTEMBER, 1923

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Original Communications

TREATMENT OF CERTAIN TYPES OF GOITRES.*

By STUART McGUIRE, M. D., Richmond. Va.

The invitation to come to Baltimore and address such a distinguished group of men is an honor I sincerely appreciate.

I have been advised that in choosing my subject I should select one that would be of interest to both the physician and surgeon, and with this end in view I have decided to discuss the treatment of certain types of goitre.

I know that all of you are more or less familiar with diseases of the thyroid, but I trust I will not be tedious or wearisome in stating my personal views, and that, even if I do not advance anything new or original, I can at least refresh your minds or renew your interests in some of the questions as yet unsettled concerning the perversions of the functions of this organ.

The thyroid gland, to my mind, is in many respects the most wonderful organ in the body. Through its internal secretion it influences the physical development of the child and the mental activity of the adult. It regulates the growth of bone, the formation and distribution of fat and the nutrition of the skin, teeth, hair and nails. It plays an important part in menstruation and parturition and has much to do with sexual desire and power. It influences the rate of the heart beat and the character of the peripheral circulation. It presides over the nitrogenous metabolism of the body, and in other and perhaps unsuspected ways plays an important part in the human economy.

If thyroid secretion is excessive, there are symptoms or metabolic riot. Heat production and gaseous interchange are rapid. The body tissues are stimulated to a course of wasting dissipation. There are seen tremors, sweating,

tachycardia, muscular weakness, loss of weight and feverish mental activity. The evidence of thyroid excess suggests the entrance of tragedy into the life of its subject.

If thyroid secretion is deficient, the metabolism of the body is depressed and heat production and gaseous interchange are at a low ebb. In the young, growth is lessened and the skeletal system is dwarfed. Connective tissue cells remain myxomatous. The skin is dry and thick and the hair coarse and shows deficient nourishment. The nervous system halts in development and mentality does not rise above the level of the infant. Physically and intellectually, the victim of thyroid poverty is less a man, more a beast.

It is a temptation to speculate as to what the future may have to tell of the thyroid and other ductless glands. Who can say that the dullard, the drone and the vast army of inefficient and dependent may not be close cousins to the cretin? Who can deny that it is possible that thyroxin represents in some measures the baser ore, which worked in the fire of experience is seen and known in the gift of the gods which we call genius? What is there in the history of science to make us doubt that some day we may not find in the internal secretions a physiological explanation for the gall of Napoleon's ambition or the iron of Caesar's hand?

The essential cause of goitre is unknown, although it is thought that eventually it will be proved to be due either to the direct infection of the thyroid with bacteria, or the indirect action on the thyroid of toxins from infection in other regions such as the teeth or tonsils.

Goitre is much more common in women than in men, and this is believed to be due to the fact that the thyroid is a sex gland, and disturbances or diseases of the organs of reproduction are more frequent in the female than in the male.

Goitre is endemic in some sections of the

*Read at meeting of the Medical and Chirurgical Faculty of the State of Maryland held in Baltimore, April 24-26, 1923.

country and this type is believed to be a geologic deficiency disease due to lack of iodine. By the proper administration of iodine to the pregnant woman and to the child during the period of adolescence endemic goitre may be prevented.

The frequency of goitre varies greatly in different sections of the country. The rigid inspection of a large number of men made during the recent war gave interesting and reliable statistics. Figures at the Surgeon-General's Office, based on the result of the examination of the first million men enlisted in the United States Army, showed that simple goitre was present in 14.79% of the recruits from the State of Washington and in only .75% from the State of Virginia.

From the standpoint of the clinician, goitres may be divided in four types, the adolescent, the simple, the toxic-adenoma and the exophthalmic.

Adolescent goitres are seen in young girls from the age of 14 to 20 years. The gland is symmetrically enlarged and increases in size with each menstrual period. The patient is usually nervous and often obsessed with morbid fears, but the symptoms attributed to the goitre are due to hysteria or other causes. Every surgeon has many cases of the adolescent type brought to his office. If he is competent and conscientious, he tells the patient that the condition is not a serious one and advises a life free from excitement or over exertion, an abundance of pure drinking water and perhaps the administration of iodine. Such cases usually get well with or without treatment.

Simple goitres are symmetrical in shape if due to a general parenchymatous hypertrophy, or asymmetrical if due to a cyst or adenoma. They do not produce constitutional disturbances, but simply give rise to deformity of the neck and mechanical symptoms due to pressure. Some of these cases may become toxic or in rare instances undergo malignant degeneration. Operations for simple goitres are indicated to correct deformity, to relieve pressure and to prevent the possibility of the development of toxic symptoms or malignant disease.

Toxic goitres or toxic adenoma develop in patients who usually have had a simple adenomatous goitre for years. These patients, in addition to the symmetrical enlargement of the

thyroid, have nervousness, tachycardia, coarse tremors of the fingers and marked loss of weight and strength. Their basal metabolism is perceptibly increased. Unlike the exophthalmic type, they have no marked changes in the eyes. Owing to the chronicity of the disease there is apt to develop secondary degenerative changes in certain vital organs such as the heart, liver and kidneys. Operations for toxic adenoma are urgently indicated. If done early, they are safe, as post-operative reaction is not usually severe and the general condition of the patient is good. If done late, operations are attended by great risk to life, and patients who recover are not usually restored to health, because it is impossible to cure the organic changes that have taken place in the heart, kidneys or other important viscera.

Exophthalmic goitres are due to a hyperplasia of the essential cells of the thyroid and are usually symmetrical in shape. The histological section of an exophthalmic goitre bears the same resemblance to the normal gland that a section of a lactating breast bears to the non-lactating organ. The symptoms of an exophthalmic goitre are not those of local pressure, but of constitutional intoxication from excessive thyroid secretion. The symptom-complex is a familiar one: nervousness, tremors, tachycardia, exophthalmos and feverish mental activity. The basal metabolic rate of these patients is markedly increased. The chief diagnostic differences between exophthalmic goitres and toxic goitres are that the exophthalmic type is usually seen in younger patients, that the symptoms develop more quickly and with greater intensity, and that there is the presence of the characteristic eye changes which are absent in the toxic variety.

There is no difference of opinion in the profession as to the treatment of the first three types of goitre. Adolescent goitres should be treated by medical and hygienic measures. Simple goitres should be operated on if they cause deformity or give rise to pressure symptoms, the patient often being the best judge as to when the disfigurement or discomfort they produce are sufficient to justify an operation. Toxic goitres or toxic adenoma should be removed as soon as discovered, as they do not tend to spontaneous cure or yield to non-operative treatment, and delay leads to incurable structural changes in the heart, kidneys and other vital organs.

When it comes to the treatment of the fourth type, or exophthalmic goitre, however, there is a sharp difference of opinion as to the proper procedure to be followed.

In reviewing the literature of the treatment of hyperthyroidism, one is struck by the fact that honest and experienced men hold divergent views, and that the same man often changes an apparently fixed opinion and attaches little importance to what he at one time considered an essential feature in the treatment of the disease. Until recently it has been impossible to analyze the results reported by different clinicians in series of cases treated by different methods, and to determine what influence was exercised by individual skill and what by the procedure employed. The recent introduction of the metabolic test, however, bids fair to settle many questions under discussion.

It has been demonstrated that the thyroid regulates the general metabolism of the body and that an increase or decrease of thyroid activity is accurately shown by corresponding changes in the patient's metabolic rate. Hence, by determining the degree of metabolism, we now have a scientific means by which we can estimate thyroid activity in an individual case and can tabulate mathematically the effect of the various forms of treatment that are advocated for its abnormalities.

There has not yet been sufficient experimentation or practical experience with basal metabolism to determine its exact clinical value. Like the thermometer it promises to be a most valuable agent, but also like the thermometer its record must be considered together with the patient's clinical symptoms. A patient with typhoid fever who has high temperature will not necessarily die, or one with a low temperature necessarily live. Likewise, a patient with hyperthyroidism may have a high metabolic rate and not be as seriously sick as another with a low rate who has structural changes in the heart, liver and kidneys.

I have found that the basal metabolic rate corresponds pretty closely with the patient's history and symptoms and with the pathological findings of the specimen removed, still I have not come to rely on it as a criterion of operability. This must be decided only after taking every factor into consideration. I have come to rely on basal metabolism, however,

first in making a diagnosis in early cases. The onset of hyperthyroidism is usually so gradual that it is difficult to recognize it in its incipency and here the metabolic rate will clearly differentiate it from hysteria, neurasthenia, tuberculosis and other conditions with which it may be confused. Second, in making a prognosis in late cases, the metabolic rate will determine whether the symptoms are due to the goitre or to degenerative changes in the vital organs and will indicate the danger of the operation and the results to be expected if the patient lives. Third, in assigning a relative value to the different forms of treatment advised for the relief or cure of hyperthyroidism, we are enabled to discard fuss, feathers and foolishness and to concentrate on measures of proved efficiency.

When I began the practice of medicine, it was in an era when electricity was employed in various forms for the treatment of diverse diseases. My father's office was equipped with faradic, galvanic and static machines, and under his supervision I applied the interrupted current to wasted and paralyzed muscles, employed electrolysis after the method of Apostole to absorb fibroid tumors, and sprayed and sparked the heads and backs of neurasthenic patients seated on glass stools. Among other cases was a group of goitre patients who were treated by cataphoresis, the negative pole saturated with tincture of iodine being placed on the enlarged thyroid and the positive pole at the back of the neck. Some of these patients were apparently markedly improved and as a result the number of goitre patients coming for treatment rapidly increased.

I soon grew tired of this routine and uninteresting office work and reading of the results being secured by Kocher of Switzerland, I began to importune my father to treat some of these cases surgically. He finally told me that he had once attempted the operation and that it was the most bloody and barbarous work he had ever done, and he concluded by saying "every man must learn by his own experience, but if there is one thing you may learn from me it is never to operate on a case of goitre." This advice was good for its day and generation. Kocher's mortality in his first seventy operations for simple goitre had been 40% and Chas. H. Mayo's mortality in his first sixteen cases of exophthalmic goitre had been 25%, and it is no wonder that the operation

was then regarded by the majority of surgeons as unwarranted.

Seventeen years ago I did my first thyroidectomy, and I have now operated on more than eight hundred patients for goitre.

In the first hundred operations I had no deaths. This was because I picked my cases. In my second hundred operations I had five deaths. This was because I had become bolder and accepted bad risks. I then became more conservative and adopted the position of Mayo, who at that time held that a thyroidectomy should not be considered a life saving measure and should not be performed on a bad risk, but that such cases should be treated by non-surgical measures and if they failed to improve should be allowed to die a medical death. Under this policy my mortality became satisfactory, but I was rendered unhappy by the necessity of refusing to intervene in certain cases where operation seemed to offer the only chance for life.

Finally, I adopted the teaching of Crile and now operate on every case of hyperthyroidism that is referred to me unless the patient is practically moribund. By adopting many of the measures Crile advises, I have had but three deaths in the last four hundred patients operated on for goitre. I have had my share of bad risks and I have not dodged any of them.

In what I have said I have been personal and reminiscent, but I have run the risk of criticism for a purpose. I wish to present certain views on the treatment of hyperthyroidism which differ from those held by other surgeons of greater reputation and larger experience, and I would not have the courage to do so unless I was able to justify my opinions by my results. It is true that my series of cases is small compared with those of certain large clinics, but it must be remembered that I have personally studied, operated on and cared for each patient, that I have rejoiced in their recoveries or grieved at their deaths, and that the experience gained has made a profound impression on me.

While we do not know much about the etiology of exophthalmic goitre, it is a fact that the condition frequently follows some acute disease and is maintained by a local focus of infection. Before beginning the treatment of any case, the tonsils and teeth should be examined and other possible sources of poison

should be determined and, if any diseased condition is discovered, it should be corrected. Recently an early but very acute case of exophthalmic goitre was brought to me. The patient had lost fifty pounds in weight, her pulse varied from 140 to 160, her metabolic rate was plus 87 per cent and she was delirious a greater part of the time. Examination showed abscesses at the roots of four teeth. The teeth were extracted and her symptoms immediately began to improve, without other treatment except rest and proper feeding; she made a rapid recovery, and is now apparently restored to health.

The first and most essential factor in the medical treatment of hyperthyroidism is rest. It should be absolute and complete and must be mental as well as physical. It is useless to try to secure it at home. Patients should be placed in a hospital where they can be under proper control.

Means and Aub studied the effect of rest on a group of cases. These patients had an average metabolism of plus 81 per cent and after from one to three weeks the same group had an average of plus 67 per cent. In a few of the more toxic cases the curve rose in spite of rest. There was no case in the series whose metabolism was brought to normal by rest alone. After about two weeks a level is reached and rest will not cause a further drop.

An ice bag over the heart seems to slow its rate and quiet its tumultuousness, and its application serves to keep patients more quiet in bed as they refrain from turning and twisting for fear of displacing it.

Water should be given in abundance in order to eliminate toxic products from the system by the way of emunctories. Distilled water, while not as palatable, will be found to be more efficient. This is partly due to its greater solvent qualities, but more largely due to the fact that patients think it has special merit and will drink it in larger quantities.

The diet of these patients is important. The machinery of their system is being driven under forced draft, and they need fuel to save the consumption of their own tissues. Food should be given every three hours and in as large quantities as possible without creating digestive disturbances.

The administration of various drugs with a view of lessening metabolism has been advocated. Of these hydrobromate of quinine with

ergotine, glycocholate of soda and pancreatic extract have the greatest number of advocates. Means and Aub have tested the action of hydrobromate of quinine on a group of patients and find that it had no apparent effect on the metabolic rate of the cases. While it is only of historic interest, it may be mentioned that the effect of Beebe's serum on metabolism was also tested and found negative. The administration of digitalis is recommended by Willius, not for its effect on metabolism, but because of its influence on the heart.

The use of X-ray has long been advocated in these cases and more recently the application of radium has been recommended, the theory being that a sclerosis is produced which lessens glandular activity. The relative merits of X-ray and radium have not been determined, but it seems that the choice is largely a question of the experience of the operator and the convenience of the patient. Means and Aub tested the effect of the X-ray on a group of cases. These patients had an average metabolic rate of plus 63 per cent. After one or two treatments at intervals of one month there was a reduction to plus 52 per cent. After four or five treatments there was a reduction to plus 40 per cent, and after two or three years' treatment there was a reduction to plus 13 per cent. The advantages claimed for the X-ray method of treatment are that it avoids an operation and is attended by less danger to life. The disadvantages are the increased length of invalidism, the greater difficulty of operating if surgery is ultimately necessary, the possibility of shrinkage of tissues of the neck, the danger of myxedema and of X-ray burns and the liability of treating colloid and cystic goitres which are not benefited.

The injection of boiling water or a solution of quinine and urea into the body of the thyroid has been advised. The theory on which this practice is based is that the destruction of the glandular cells and the obstruction of blood vessels will cut down the output of thyroid secretion. The method is not without immediate or remote disadvantages and dangers. Some patients are so sick that even this apparently simple procedure will cause an acute and perhaps fatal hyperthyroidism, others will not be benefited and a subsequent surgical operation will be made difficult by the adhesions it has caused, and

finally the irritation may result eventually in the development of cancer. Balfour reports 103 cases of malignant disease of the thyroid and it is a significant fact that seven gave history of having been treated by the injection method.

If a patient has time and money and is willing to make a pet of a diseased gland and try to humor it back to a normal condition, then palliative measures may be tried, but it is generally conceded at the present time that the safest, surest and quickest way to effect a cure is by surgery. The practice of destroying a portion of a gland in order to lessen its physiological activity is certainly illogical, but it is the best we can do until some chemical antidote for thyroxin is discovered.

The operations done for hyperthyroidism are ligations and partial thyroidectomies. The advocates of ligation state that while the benefits which follow the operation are marked, they are not permanent and that they should only be employed either as a test of a patient's reaction to trauma in cases where there is a doubt of the individual's ability to stand a thyroidectomy, or as a means to get a patient in condition for a more radical operation when it is obvious that at the time a thyroidectomy could not be done without great hazard. Observations in the various surgical clinics of the country show that the number of ligations being done is steadily diminishing and personally I have given them up altogether.

The favorable results attributed to ligations cannot be explained on an anatomical or physiological basis. The theory that ligations act by cutting down the blood supply is refuted by the experience of every operator who knows that tying one or more of the principal arteries does not materially diminish the vascularity of the gland. It is stated that all the blood in the body passess through the thyroid once every hour and ligations actually increase the blood supply by the formation of collateral branches. The theory that ligations interfere with trophic influence is an explanation that has no physiologic parallel in other parts of the body and is an argument about as mysterious and no more logical than those advanced to support Christian Science. The effects of ligations are in my opinion largely due to psychic influence and to the subsequent treatment of the patient and the same results can be secured by safer and less heroic means. In mild

cases ligations are unnecessary, and in severe cases they are more dangerous than a lobectomy or partial thyroidectomy. The greatest danger of an operation for exophthalmic goitre is acute post-operative hyperthyroidism and this is caused not by the amount of the gland taken out but by the amount of the gland left in, and can be best minimized by the removal of a large portion of the thyroid. In the early days of my work I had some bad results because I was timid and did not remove enough of the gland. With increasing confidence I have taken out more and more tissue and have secured better immediate results and have seen no remote bad consequences. I now do a double partial lobectomy, only leaving a small portion of the gland attached to the posterior capsule on either side. This leaves sufficient thyroid tissue to carry on the normal functions of the body, protects the recurrent laryngeal nerve and other important structures from injury, and gives good cosmetic results, as it does not destroy the symmetry of the neck.

The results of partial thyroidectomy are prompt and permanent. If the operation does not effect a satisfactory cure, it is because either not enough of the gland has been removed or that the operation has been delayed until the patient's symptoms are no longer due to hyperthyroidism, but to organic changes in the vital organs as well.

I do not wish it to be inferred that a radical operation should be done for a bad toxic or exophthalmic goitre without careful preliminary study and often prolonged treatment of each individual case. The patient should be put to bed, given absolute physical and mental rest, an ice-bag applied to the chest, and water and food properly regulated. The fluctuations of the disease should be carefully watched and the operation fixed for the most propitious time. Every effort should be made to inspire the patient with confidence and to relieve apprehension and fears.

A few patients will not bear transportation and should be operated on in their rooms without moving them from bed. Some do best under local anesthesia, others require light nitrous oxide oxygen in addition. Often after the removal of the desired amount of glandular tissue it is wise to pack the wound and delay closure for two or three days. It is always well to provide for liberal drainage. After the operation water should be given by

rectum or subcutaneously, morphia without atropia administered to relieve pain and quiet restlessness, and cold sponges or ice packs employed to combat fever if elevation of temperature occurs.

THE TREATMENT OF LOBAR PNEUMONIA DUE TO PNEUMOCOCCUS INFECTION.*

By LEWELLYS F. BARKER, M. D., Baltimore, Md.

Lobar pneumonia due to pneumococcus infection has well been designated the "captain of the men of death." The appalling mortality from this disease and the fact that the majority of the patients suffering from it are treated by general practitioners rather than in hospitals make a discussion of the treatment of the malady worth while in a meeting composed of men engaged in general practice.

The incidence of and mortality from pneumonia vary greatly at different periods of the year. As many people die of pneumonia during the first four months of each year as in the whole of the rest of the year. Indeed it is probable that the total mortality from January to April exceeds that from May to December.

A comparatively benign malady in early life, the mortality rate in lobar pneumonia increases with every decade, until between the ages of sixty and seventy probably three-quarters of all who are affected die of the disease, though the average mortality for all ages may not exceed perhaps twenty per cent.

SYSTEMATIC METHODS OF TREATING LOBAR PNEUMONIA NOW LARGELY DISCARDED.

No chapter in the history of medicine is perhaps more interesting than that which deals with attempts at systematic treatment of lobar pneumonia. From the earliest times on, various remedial agents have been successively landed for their curative power in this disease. But each of these methods of systematic therapy has in turn been abandoned. One master of medicine after another has prided himself in introducing a cure for lobar pneumonia. But despite every effort the average mortality has through the centuries remained nearly the same.

Let me remind you of some of these syste-

*Read at the Seaboard Medical Society, Newbern, North Carolina, December 6, 1922.

matic methods of treating the disease and their failures; they will serve as notable examples of the excessive therapeutic credulity of many of the great leaders in our profession. Thus, Brown was a believer in the efficacy of "excitants" to increase the "sunken irritability" in lobar pneumonia. He gave wine, brandy and opium with this purpose in view, and a similar theory was responsible for the massive doses of alcohol prescribed by Todd in England and by Delhier in France. An opposite theory lay at the basis of the large doses of tartar emetic ("contra-stimulation" of Rasori), a therapy much employed by no less a man than Laënnec.

Local and general bleeding also had great vogue for a long period for the combating of the inflammation of the lungs, a therapy strongly advocated by Broussais and later by Bouillaud, both French clinicians of eminence in their time. It is recorded that Broussais in his own last illness ordered six venesections and the application of over sixty leeches to himself. In the year 1819, in his division of the Val de Grace Hospital, more than one hundred thousand leeches were used. So popular became this method of treatment that in France in the year 1824 as many as three hundred thousand leeches were applied, and in the year 1827 some thirty-three million leeches were made use of. Bouillaud pushed bleeding to an extreme, in many cases causing syncope. His idea was to bleed the patient until he was white (*saigner a blanc*)! So universal had the custom of bleeding in pneumonia become that in 1849 a physician was put under arrest for not bleeding a patient who suffered from the disease.

A little later, the treatment of pneumonia by means of large doses of digitalis was recommended by Hirtz of Nancy and by Petrescu of Bucarest. Even Traube had confidence in the combination of bleeding and digitalis therapy.

Still another method of systematic therapy was campher in large doses recommended by Seiffert of New York and by Oppenheim and Loeper in Europe.

Notwithstanding the advocacy of each of these methods by men of real eminence they have all fallen into disfavor, and the remedies that were vaunted for universal application are now restricted to employment only on special indication.

THE ERA OF THERAPEUTIC NILHILISM.

It is but little wonder that therapeutic scepticism greatly increased as clinicians gradually became aware of these successive failures in those systematic methods of treatment of lobar pneumonia to which I have referred. It was Skoda, especially, who emphasized the fact that patients suffering from lobar pneumonia recover just as often when nothing is done except to keep the patient comfortable in bed on a simple diet as when heroic methods of therapy are employed. It was only through experience that physicians learned how well patients suffering from pneumonia can do when left to nature's method of cure. During the years 1842 to 1846 in the Weiden District Hospital in Vienna, three hundred and eighty persons were treated for primary pneumonia, eighty-five of them by venesection, one hundred and six by large doses of tartar emetic, and one hundred and eighty-nine simply by dietetic measures. The results reported were as follows:

CURED:	
With venesection -----	68
With tartar emetic -----	84
With dietetic methods -----	175
DIED:	
With venesection -----	17
With tartar emetic -----	22
With dietetic methods -----	14
MORTALITY RATE:	
With venesection -----	20.4%
With tartar emetic -----	20.7%
With simple dietetic methods -----	7.4%

This was a remarkable showing and led many conservative clinicians to follow Skoda's example of utilizing only expectant and symptomatic methods of treatment. His maxim was, "Observe the course of a disease when it is left to itself, uninfluenced by drugs."

CRITERIA FOR JUDGING OF THE EFFICACY OF THERAPY IN LOBAR PNEUMONIA.

We have seen how, systematic therapy proving a failure, clinicians came gradually to rely upon expectant and symptomatic treatment only. They were content to relieve symptoms as they appeared and to use special methods of treatment only when they seemed to be indicated by the appearance of special symptoms or signs.

In recent years attempts at specific therapy (as contrasted with expectant symptomatic therapy) have been revived, particularly since our knowledge of the infectious processes has

grown, and methods of vaccine therapy, immunotherapy and chemotherapy have developed. In order, however, to judge of the efficacy of any specific method of therapy, careful clinicians are no longer content with the mere impression that a given therapy exerts a favorable effect. They demand the application of objective methods of measurement before passing judgment upon efficacy on the one hand or of worthlessness on the other.

In general, it is now recognized that the course of a lobar pneumonia depends partly upon the number and virulence of the invading microorganisms (pneumococci) and partly upon the powers of resistance and the mode of reaction of the sick person. As every general practitioner is aware, pneumonia is a more fatal disease in some epidemics than in others, and even in one and the same epidemic the virulence of the micrococcus lanceolatus may vary considerably. Attention must be paid, therefore, to both epidemiological and individual factors when judging of the efficacy of any form of specific therapy. Accordingly, the statistical results must include (1) a large number of cases (on account of individual differences) and (2) cases from more than one period of prevalence (on account of differences in epidemiological factors). It is desirable also that the statistics include (3) cases occurring in different localities. Finally, it is desirable (4) to group the cases according to the type of *pneumococcus* that is causal.

One of the best methods of judging the efficacy of a therapy is to compare in the same epidemic the results obtained in patients under treatment with those obtained in control cases not subjected to the treatment. The epidemiological factor is then the same in the treated and in the untreated cases. As Cahn-Bronner has emphasized, statistics that deal with contemporaneous cases where there are both control cases and treated cases of a similar sort, and where the material is abundant and is distributed over several years, afford the requirements for an objective judgment of the influence of a given therapy. In other words, the most careful clinical observation of single cases thus studied will yield information not derivable from the haphazard study of statistics that have not been similarly controlled.

When the treatment of the disease is begun late, the most important criterion of its efficacy is the mortality rate. When the treat-

ment on the other hand has been begun early, one can use as a criterion not only the mortality rate but also the duration of the fever after the initial chill or, in its absence, after the first rise in temperature.

DISCUSSION OF CURRENT CONCEPTIONS OF PNEUMONIA THERAPY.

In our time, following the lead of clinicians like Billings, Fitz, Janeway, Osler, and Shattuck in this country, most practitioners in the treatment of lobar pneumonia have been content with the institution of a simple dietetic-hygienic regime, with expectant-symptomatic therapy, and with the treatment of complications. They soon became aware that patients suffering from milder forms of lobar pneumonia get well spontaneously, and that no violent therapy of any sort is needed, or is beneficial if applied. In the severer forms of pneumonia they have learned that great care in the general management of the case (especially good nursing, close attention to the relief of troublesome symptoms, and support of a failing circulation) will often turn the balance in favor of the patient and save his life. In the worst forms of pneumonia, especially the asthenic types of the aged, the therapist has been practically helpless and has been compelled virtually to throw up his hands!

Recently, in addition to the simpler forms of therapy just mentioned, new hope for specific forms of therapy has been aroused. Before discussing the newer causal therapy, however, it will be convenient to refer in more detail to the main points of practical importance in functional, regulatory and symptomatic therapy.

FUNCTIONAL REGULATORY AND SYMPTOMATIC TREATMENT OF PNEUMONIA.

Symptomatic therapy neither attempts to intervene in the disease process as such nor to attack its cause, but does make the effort to relieve single troublesome symptoms. *Functional therapy* tries to restore some normal function that through the disease has become disturbed or abolished. And *regulatory therapy* attempts to aid the body in reacting against the disease process or the disease cause. These forms of therapy, symptomatic, functional and regulatory, are the forms that we have relied upon most since the abandonment of the old systematic methods of treating

pneumonia and before the advent, very recently, of new forms of etiotropic therapy.

Lobar pneumonia usually begins abruptly with a chill, a stitch in the side, and a rapid rise of temperature; these are the symptoms that bring the practitioner to the patient's bedside. It is only rarely that these symptoms are preceded by prodromata such as headache, pains in the limbs, anorexia, or signs of bronchitis. The actual onset is usually so characteristic that the experienced practitioner, when he hears the history of chill, of pain in the side, and of fever, when he observes an increased respiratory rate, an accelerated pulse rate, and delayed expansion on one side of the chest with perhaps a little suppression of the breath sounds there or a few fine crepitant rales, knows that he is dealing with the onset of a lobar pneumonia. He will, if there be an excruciating pain in the side, relieve it promptly by a small dose of morphine and will then immediately set about the organization of the sick room, and the nursing, and will arrange for the general management of the case.

GENERAL HYGIENIC AND DIETETIC REGIME.

The patient will be kept quietly in *bed*, a place in most cases already sought before the advent of the physician. He should be dressed in a light night-gown, which opens at the back rather than in front, or which opens both in front and behind. The bed and mattress should be comfortable and the covering warm but light. A blanket and a rubber sheet should be placed under the bottom white sheet to ensure warmth and dryness. A hot-water bag should be placed at the patient's feet, the hot water being renewed at frequent intervals.

The *room* should be large, exposed to sunlight and well ventilated. Most rooms can be sufficiently well ventilated by means of windows. If a sleeping porch be available, it may be employed. For a period, at the Johns Hopkins Hospital, we placed all pneumonia patients out-of-doors, even in the winter time, and I must admit that they did very well. I see no reason, however, for insistence upon out-of-door treatment provided an in-door room is well ventilated. Nursing and medical attention can in-doors be given so much more easily than outside that the advantages seem to me to be on the side of in-door rather than of out-door treatment.

The *surroundings* of the patient should be

quiet; he should be left very largely to the ministrations of the nurses and the physicians. He should lie in an atmosphere of reassurance. Members of the family or friends who would disturb such an atmosphere should not be admitted. Family visits should be limited to one or two persons at a time and the stay of each should be brief.

In the treatment of pneumonia, *good nursing* is one of the most important features. The chances of the patient for recovery are distinctly increased if it is possible for him to have two well trained nurses in attendance, one for the night and one for the day. Such ideal nursing care is, however, possible only for the well-to-do, and circumstances must determine what approximation to this ideal is feasible in a given case. The nurses will keep the patient comfortable in bed, and will prevent unnecessary exertion. They will control the ventilation of the room and the number and character of visitors admitted. They will keep the clinical charts for the physicians, on which the temperature, pulse, respiration, fluid intake, fluid output, bowel movements, and prominent symptoms are registered. They will see to it that food and water are administered at regular intervals, and they will be always at hand to facilitate the physical examinations that are made by the physician and to carry out faithfully the therapeutic regimen he prescribes. Members of the family or friends, with the best will in the world, cannot do for a patient what a trained nurse can do, and the wise physician will see to it that, whenever practicable, the patient's chances for recovery are favored by the institution of skilful nursing from the very start.

The *diet* should consist of liquid food, chiefly of milk, or of milk with a little cereal added to it, though at intervals chicken broth or meat or vegetable broths may be added for variety. In the milder cases eggs, either soft boiled or raw, or in the form of egg albumin, may be administered. In addition, the patient should drink freely of water or of lemonade, and if desired some cane sugar may be added to the lemonade and some milk sugar to the milk. In severe cases with delirium, insufficient food and liquid may be taken by the mouth, in which case it may be necessary to administer it per rectum or even subcutaneously. Vomiting also may interfere with oral administration of food and liquid, in which event sub-

cutaneous infusions of salt solution containing glucose may be administered, or one may give a 0.047% solution of glucose per rectum by the Murphy-drip (fluid warmed to body temperature; one liter introduced by the drop method twice a day).

That due attention to *evacuation of the bowels* should be given goes without saying. If the patient is seen at the start he may be given two grains of calomel at night followed by a saline the next morning. A daily movement of the bowels should be secured by means of salines, of enemata, or by the use of a little castor oil. Drastic purgatives should be avoided. In toxic cases diarrhœa is sometimes a troublesome symptom and may require checking by means of a little Dover's powder or a little paregoric after each movement.

Hydrotherapy, internal and external, is an important item in the general regime, since it goes far toward combating the effects of the toxemia and in preventing circulatory failure. In mild cases a tepid sponge once or twice daily, disturbing the patient as little as possible, contributes to the patient's well being and somewhat lessens the fever. If the temperature be very high, a cold sponge may be given every three hours or the patient may be wrapped in wet cold compresses (wring out of water at a temperature of 78° to 60° Fahrenheit) every hour. Some physicians immerse patients showing hyperpyrexia in a cold tub just as in the treatment of typhoid fever by the Brand method. In my experience, however, cold sponging or the application of wet compresses yields fully as satisfactory results and is less disturbing to the patient and makes smaller demands upon the nursing force and attendants; moreover the psyche of the patient is less agitated. In applying cold compresses it is best to wring the compresses out of cold normal salt solution rather than out of plain water, to avoid maceration of the skin with predisposition to local skin infections.

The *mouth* should be kept clean and moist by the nurse. In mild cases the patient may rinse it at frequent intervals with a suitable mouth wash and may even use the tooth-brush morning and evening. In severe cases the care of the mouth must be left entirely to the nurse who will clean it with a swab soaked in mouth-wash.

The *nose*, too, should be kept clean and if possible open. If there be swelling of the tur-

binates and obstructed nasal breathing temporary relief may be given from time to time by snuffing up a menthol-eucalyptol ointment.

Many physicians feel that from the beginning it is desirable to administer regularly some form of drug, partly in order that the patient and his friends may feel that something in a pharmacotherapeutic way is being done, partly because they believe that the administration of a mild diuretic like potassium citrate (one gram four times a day) or a mild diffusible stimulant like ammonium acetate (one gram three or four times per day) will contribute something to the welfare of the patient. I can see no especial objection to the administration of either of the remedies mentioned though I am doubtful whether they are of any real value aside from the psychotherapeutic effect that they may produce. I should warn, however, against the routine administration of any drug that can be disturbing to the digestion of the patient or that causes discomfort in any form. The expectorant mixtures are particularly to be condemned; they do no good, most of them are disagreeable to take, and many of them disturb digestion by exciting nausea or causing meteorism.

THE RELIEF OF SINGLE SYMPTOMS.

The more experience one has in the treatment of pneumonia the greater his recognition of the salutary effects on the patient of relief of disturbing symptoms, especially pain, cough, dyspnoea, insomnia, and abdominal distention.

Cough.—It is especially the dry cough at the onset of the disease and during the period of consolidation that demands symptomatic relief. It is very fatiguing to the patient; it increases the pain in the side during the day and, if left uncontrolled at night, keeps the patient awake. This dry and, for the most part, non-productive, cough can be sufficiently controlled during the day by a twelfth of a grain of heroin and a quarter of a grain of codein given in tablet form every two, three or four hours as required. At night it is well to administer, hypodermically, a small dose of morphine at 9:00 P. M. and to leave an order for its repetition during the night if the cough is disturbing. It is surprising what small amounts of morphine will suffice; for some patients 1/16, 1/12 or 1/8 of a grain are adequate. It does not seem to me right to permit patients to be harassed by racking cough

during an acute pneumonia when this cough can be fairly well controlled by the methods described and without harm to the patients.

Pain.—The pain in pneumonia, usually described as a "stitch in the side," is due to a dry pleurisy where the lobar pneumonic process reaches the pleural surface. It is often so violent at onset as to require a small hypodermic of morphine for its relief. When less severe, the application of a flat ice-bag or of salt solution compresses may sufficiently ameliorate. The older clinicians were wont to apply wet or dry cups, mustard plasters, blisters or poultices for the relief of this pain. Though these measures in many instances ease the pain, they are objectionable since they irritate or macerate the skin, favor local skin infections and interfere seriously with physical examinations of the chest. Instead of applying poultices of flaxseed or of kaolin one does better to be content with a flat ice-bag or with salt solution compresses at the beginning and to follow these later with a simple "pneumonia jacket" (to open both in front and behind) made of cotton batting stitched between layers of cheese-cloth.

Dyspnoea.—The shortness of breath and the accelerated respiratory rate at onset are usually relieved when the pain of the stitch in the side is assuaged and after mild hydrotherapeutic measures have been instituted. If, however, great oppression be felt owing to massive pulmonary involvement and especially if the patient be full blooded, a venesection or the withdrawal of from 300 to 500 cc. of blood by means of a syringe from a vein at the bend of the elbow will often give marked relief. In the dyspnoea of the later stages, especially when associated with anoxemia, inhalations of oxygen may be really valuable. The ordinary methods of administering oxygen are, however, very faulty. When oxygen is needed, it is best to administer it by the Haldane method, which permits a certain intake of 2.5 litres of oxygen per minute (Meakins), or by means of Meltzer's hollow tongue depressor. In hospital practice where a respiratory cabinet is available, the patient may be placed in the cabinet filled with oxygen (Means).

Insomnia.—This is often a distressing symptom and is associated with restlessness that adds greatly to the fatigue of the patient. As has been pointed out it often depends upon the dry racking cough and small doses of morphine, which lessen the cough and relieve the

pain, also give sleep. In the absence of cough and pain an adalin-luminal tablet, a small dose of barbital or of one of the barbital derivatives, or a dram of the mistura chloralis et potassii bromidi composita (N. F.) may contribute to a restful night.

Abdominal Distention.—Distention of the abdomen is a common symptom in lobar pneumonia and is often an evidence of a severe toxemia causing atony or paralysis of the wall of the intestines. Much can be done to prevent its development by keeping the mouth clean, by careful attention to the diet, by regular evacuation of the bowels, by forcing water, and by external hydrotherapy. Tympanites often develops, however, despite these measures and demands symptomatic treatment. Turpentine stupes to the abdomen, turpentine enemata, or the occasional passage of a rectal tube, permitting the gas to escape, may do much to relieve it. In severe meteorism I have several times seen much benefit follow the hypodermic administration of pituitrin in full doses (1 cc. ampoule). Occasionally 1 cc. of pituitrin will cause cramping of the intestine and pain in which event $\frac{1}{2}$ cc. may be given and repeated after a few hours. Tympanites should not be neglected for, pressing the diaphragm up, it further interferes with a respiration that is already impaired, increases the dyspnoea and anoxemia, and throws a greater burden upon the right heart.

TREATMENT OF THE COMPLICATIONS OF LOBAR PNEUMONIA.

Space will not permit of a full discussion of all of the possible complications of lobar pneumonia and I shall refer only to those that are more common; especially to toxæmia, circulatory failure, and empyema.

Severe Toxæmia.—As I have said, the physician does much to combat the toxemia by instituting a careful general dietetic-hygienic regime, and, especially, by internal and external hydrotherapy (which promotes elimination through the skin and kidneys) and by saline laxatives or enemata.

Severe toxic symptoms can sometimes be ameliorated by venesection. When patients do not swallow sufficient fluid, the toxæmia is likely to be more marked; salt solution should then be injected subcutaneously (300 cc. to 500 cc.) and salt and glucose solutions may be given per rectum by the Murphy-drip method.

Circulatory Failure.—The most dreaded

complication of pneumonia and that responsible for death in perhaps the majority of cases is circulatory failure, dependent either upon weakness of the myocardium or, more often perhaps, upon loss of tone of the peripheral arterioles (vasomotor paralysis). It is for this reason that cardiotonic therapy and measures designed to maintain the tone of the peripheral arterioles have long been popular in the therapy of pneumonia. Many clinicians use digitalis from the beginning, in the hope of maintaining the tonicity and contractility of the cardiac muscle, especially that of the right ventricle. There would seem to be no objection to this in patients who before their attack of pneumonia have suffered from cardiac or renal disease, though in my opinion it is not desirable as a routine measure in all cases. The closest watch should be kept, however, upon the behavior of the heart, and when signs indicating overstrain of the right heart develop, therapy should be prompt and vigorous. Digitalin or strophanthin may be given by intramuscular injection and, if there be marked cyanosis or signs of a developing pulmonary oedema, venesection should not be delayed. In incipient pulmonary oedema, in addition to the measures mentioned, a subcutaneous injection of morphine with atropin, or of atropin alone, may be helpful.

A change in the quality of the pulse may be an important indication for therapy. As soon as the pulse tends to become faster, to be smaller in volume, and softer, the administration of caffein or of camphor should be begun. One may give 0.1 of caffein sodium benzoate from three to five times per day by mouth, or powdered camphor (0.2) with benzoic acid (0.2) and a little milk-sugar three times per day by mouth. If the pulse failure develop more rapidly, caffein sodium benzoate may be given subcutaneously (in 15% aqueous solution), or camphor may be given subcutaneously in doses of 2 to 5 cc. of camphorated oil (20% solution.) Strong black coffee is an excellent stimulant for the heart, given as hot as the patient can drink it. Alcohol is indicated if the patient has been accustomed to taking alcohol regularly. Pneumonia in alcoholics is particularly fatal and delirium tremens (an abstinence phenomenon) is likely to develop when an old toper is suddenly deprived of his regular alcoholic intake.

In vasomotor paralysis, in addition to the cardiotonic therapy just mentioned, an effort

may be made to restore the peripheral arterial tone by the administration of pituitrin, of epinephrin, or of ergotol subcutaneously, and possibly something may be done to stimulate the vaso-constrictor center in the medulla by the hypodermic administration of strychnine, (1/20 grain) every two or three hours. The latter drug will also be indicated if there should be a tendency to respiratory failure.

Empyema.—Every lobar pneumonia is complicated by a dry pleurisy, which is responsible for the stitch in the side at the onset. Pleurisy with serous effusion and pleurisy with purulent effusion (empyema) are more important complications. They are most often met with toward the end of the pneumonic process, or after the crisis has occurred. Regular physical examinations should be made, especially in cases in which the fever continues or in which there is a recrudescence of the fever after the crisis. An exploratory needle should be introduced when the physical signs are at all suspicious. If pus be found, the pleural cavity should be freely drained.

Jaundice.—In severe pneumonias, jaundice may appear as a complication, due either to a catarrhal cholangitis or to toxic injury to the liver itself. The complication is best ignored unless the jaundice persists after the pneumonia has run its course.

Meningitis.—Suppurative meningitis due to the pneumococcus, occurring as a complication of pneumonia, is likely to be fatal, though spinal drainage, and possibly the introduction of anti-pneumococcus serum into the subarachnoid space may occasionally be life-saving. Symptoms of meningitis, however, do not necessarily indicate a suppurative process. Meningitis serosa, or meningismus, is not uncommon as a complication of pneumonia, and the symptoms are often relieved by lumbar puncture. Many cases presenting meningismus at one time or another during the course of a pneumonia recover.

Collapse at the Crisis.—If, at the crisis, symptoms of collapse appear, with rapid feeble pulse, falling blood pressure and profuse perspiration, the treatment is the same as that suggested for circulatory failure due to vasomotor paralysis (see above). In addition, a hypodermic of atropin may be administered.

Profound Asthenia.—Asthenic pneumonia is common in the aged, and in other persons in whom resistance to infections is lowered.

The reactive powers of the organism seem to be in abeyance, for the patients may show little or no fever, only a slight cough, a little dyspnoea, few physical signs in the lungs, though they have a rapid feeble pulse, and manifest profound general weakness. Sometimes cases of asthenic pneumonia occur in small epidemics, probably owing to a peculiar virulence of the invading microöganism. The different forms of asthenic pneumonia are exceedingly dangerous; when they are met with, the prognosis should be very guarded. Cardiotonic and vasotonic therapy should be begun early. Despite every effort to increase the reactive powers of the organism, the disease is only too prone, in such cases, to terminate fatally.

MANAGEMENT OF CONVALESCENCE FROM LOBAR PNEUMONIA.

After the crisis, convalescence is, in favorable cases, rapid, and patients if not closely watched may increase their diet too rapidly or attempt to return to exertion too early. They should be kept in bed for at least a week after the temperature is normal, the diet should be only gradually increased, and careful attention should be paid to all the details of hygiene until strength has been fully restored. When allowed to leave the bed, a patient should sit up only one hour or less the first day, two hours the second day, and three hours the third day, after which, if he has grown stronger, he may be allowed to walk about a little. Should the appetite be poor some bitter tonic (nux vomica and gentian) may be given. The patient should be urged to protect himself carefully for at least a month after the illness. When possible he should have a change of air (at the sea or in the hills) until recovery has become complete. Such measures are especially important in patients who have had complications like empyema. Convalescents should be warned that those who have had lobar pneumonia once are more prone than other people to pneumonic infections; every precaution should therefore be taken to build up the general health and to avoid undue exposure to cold or excessive fatigue, especially during the winter months.

MODERN ATTEMPTS AT ETIOTROPIC THERAPY.

The mortality of lobar pneumonia, even under the most appropriate functional, regulatory and symptomatic therapy, is still very

large, and physicians are, therefore, naturally anxious for the discovery of some form of therapy that will lessen this mortality. Especially since such brilliant results in the treatment of certain infections by vaccine therapy, by serotherapy and by chemotherapy have been achieved, there has been much experimentation in the direction of the discovery of a specific therapy for lobar pneumonia due to the pneumococcus. To the present status of this phase of our subject, we may now conveniently turn.

Vaccine Therapy.—Rosenow (1918) of the Mayo Clinic has recommended the use of partially autolysed pneumococci in the treatment of lobar pneumonia, advising the administration of 1.0 cc. daily until the temperature reaches normal. He reports a mortality of only 7% in 200 cases treated. It is too soon as yet to pass judgment upon this form of therapy but it is perhaps worthy of a thorough trial in some of our organized clinics. I doubt if it is desirable for the general practitioner to resort to it until larger experience has been gained.

There is some evidence that the injection of pneumococcus vaccine (polyvalent) may be useful as a prophylactic measure at times when pneumonia is prevalent, though it is not certain as yet that such vaccination is as efficacious as the vaccination against typhoid. The report of Cecil and Austin (1918) in 12,519 instances is encouraging, as are the reports of Burnside (at Camp Dix) and of Duckwall (at Camp Taylor). It seems probable, however, that any immunity derivable from the injection of pneumococcus vaccine is of relatively brief duration.

Serotherapy.—Thanks to the researches of Rufus Cole and his associates at the Hospital of the Rockefeller Institute in New York, and to those of investigators at the Pasteur Institute in Paris, we have been given new hope for an efficacious treatment of pneumonia at least in one or two of its forms. The studies of Dochez and Gillespie (1913) and those of Lister in South Africa in the same year proved the existence of different types of pneumococci. These investigators isolated three different types (type I, type II and type III), each of which on animal inoculation gives rise to specific agglutinins and to specific precipitins. Beside these three groups, there are other forms of pneumococci (not all alike), which differ from the first three types in their morphology, in their solubility in bile, and in

the immune bodies to which they give rise. Cole at once undertook the experimental production of anti-sera for the different types of pneumococci. Thus far a specific serum of high titer has been successfully produced for type I; another serum, less efficacious, has been made for type II; attempts to produce a serum beneficial in infections from type III have been wholly unsuccessful. Infections due to pneumococci not belonging to types I, II and III, are usually benign infections ending in recovery without specific treatment.

Obviously, if sera antagonistic to the single types are to be employed therapeutically, it is desirable to determine as soon as possible after infection the particular type of pneumococcus that is its cause. Various methods of determining the type have been worked out, among them a method of mouse inoculation by Blake (1917), a method by means of a special culture medium by Avery (1918), and a coagulation method by Krumwiede and Valentine, (1918). Arrangements are now made in private bacteriological laboratories and in public health laboratories for typing pneumococci speedily, so that it is possible in most cases to receive a report within twenty-four hours after the collection of the sputum or of material obtained by lung puncture.

On account of the dangers of anaphylaxis, certain precautions should be observed before the administration of a specific serum. A history of hay fever, of bronchial asthma or of the previous use of anti-sera should make one particularly cautious. Even though the history be unsuspecting, it is probably wise to give first an intracutaneous injection of 0.02 cc. of horse serum diluted with ten times its volume of normal salt solution, and to compare the effect of this injection with that of the same amount of normal salt solution used as a control. If the patient be sensitized, a definite wheal will develop at the site of the injection within an hour. Whether the patient is thus found to be sensitive or not, if one desires to be entirely safe he may give a desensitizing dose of 0.5 to 1.0 cc. horse serum subcutaneously an hour or two before injecting the antipneumococcus serum intravenously.

The dosage of Cole's serum for type I is 100 cc. diluted with an equal volume, or more, of normal salt solution prepared from freshly distilled water. It is injected intravenously and at the body temperature very slowly over twenty to thirty minutes. The injection is

stopped immediately if cyanosis, dyspnoea or marked pallor should appear. Any evidence of anaphylaxis is an indication for the prompt injection of 10 minims of a 1 to 1,000 solution of epinephrin and 1/100 or 1/120 of a grain of atropin sulphate. Indeed, these remedies should be made ready for injection (in a syringe) before the intravenous therapy is undertaken.

The intravenous injection of the antipneumococcus serum is often followed by a rather pronounced reaction (fever, chill, cyanosis) in the course of from thirty to sixty minutes, but this reaction is usually followed within a couple of hours by a marked fall in the temperature and by sweating. Should the fever return within four to eight hours, a second intravenous injection of 100 cc. is given, and this dose may be repeated every eight hours until the temperature remains normal (Cole). In most cases three doses of the serum have been found sufficient.

In about half the cases that recover, the symptoms of a mild serum sickness appear in a week or ten days after injection, manifested by hives, itching, and joint pains. In a few cases the serum sickness is severe and requires epinephrin injections and local soothing applications for its control.

That the serum prepared to combat infections with type I has some efficacy seems to me to be clearly shown by the statistical results, though experience is as yet too limited to permit us to gauge very accurately the reduction in mortality that can be gained. Dr. E. A. Locke of Boston tells me that in a series observed by him the mortality was not less than that of controls that did not receive the serum. It goes without saying that the serum should be administered as early as possible after the initial chill and as soon as the typing has been completed.

What has been said above refers particularly to experiences with a high titer serum against type I pneumococcus. Favorable results have been reported by Cecil, (1918) from the use of a specific serum against type II, and Spooner, (1920), corroborates Cecil's view. Workers at the Rockefeller Institute are, however, doubtful of the possession, as yet, of a serum against type II of sufficient potency, and all agree that sera effective against type III still remain to be produced.

Truche, of the Pasteur Institute, (1919), has made four different sera corresponding to

the four different races of pneumococci. He recommends subcutaneous injections in doses of 80 to 100 cc. the first day and in doses of 20 to 40 cc. on following days, or better still intravenous injections (diluting 20 cc. of serum in 180 cc. of normal salt solution at the body temperature). Truche also uses the sera against pneumococcus infections of the pleura, of the meninges and of the endocardium. He advises intrapleural injection in doses of 60 cc. the first day and of 20 cc. on each following day after evacuation of an effusion. In meningitis he gives 40 cc. into the subarachnoid space as well as 20 cc. intravenously. In endocarditis he gives 20 cc. intravenously.

In 1921, Stengel of Philadelphia made a report on the use of serum and blood of convalescent patients in the treatment of lobar pneumonia. He advises collecting the serum from patients shortly after the crisis, keeping it on ice in a sterile container, and using it not later than from ten to fourteen days after collection. He gives from 30 to 70 cc. of this convalescent serum at a dose.

Polyvalent sera against pneumococcus infections have been prepared by Kyes and others. In one of the army hospitals, therapeutic experiments were made with Kyes' serum, and it appeared to exert at least some favorable effect.

The use of the Huntoon preparations has been advocated by some clinicians. The reactions after injection are often violent, sometimes dangerous, as in other forms of "foreign protein therapy." At present the consensus of opinion seems to be that the high titer serum produced against type I pneumococcus at the Rockefeller Institute is definitely of some value in the treatment of lobar pneumonia, due to infection with this type. Farther than this no definite statement dare yet be made.

Chemotherapy of Lobar Pneumonia.—For more than fifty years quinine has been used in one way or another in the treatment of lobar pneumonia, first as a tonic, later as an antipyretic, and still later as a specific remedial agent. Some very distinguished clinicians have been convinced of the advantages of quinine therapy. DaCosta around 1880 is said to have strongly advocated full doses of quinine shortly after the chill (S. Solis Cohen). He asserted that it will often arrest the development of an acute lobar pneumonia:—"It is difficult to prove this fact because one has no means of knowing that what is absent

was on the way. Yet it is true. The fact that pneumonia sometimes aborts spontaneously or runs a very short course does not negative this view. The real difficulty is that one rarely sees his patients soon enough." Since 1904 Solis Cohen has systematically used large doses of the double hydrochlorid of quinine and urea subcutaneously, intramuscularly and intravenously, in the treatment of lobar pneumonia (see his report, 1913).

A distinguished Edinburgh physician, the late Dr. George A. Gibson, believed that he had saved lives, even after patients had entered coma, by injections of quinine.

Aufrecht introduced the parenteral method of administering quinine in pneumonia and has systematically used it subcutaneously in the treatment of the disease since 1895. His advice was to give quinine subcutaneously when the disease is at its height, is taking a severe course and is becoming threatening, especially when the pulse is small, soft and frequent, or when slight deliria become noticeable. He thought that the beneficial results are less in its effects upon the temperature than in the specific influence that it exerts upon the causal microorganism or its products. It was rare to see a lessening of the fever; much oftener he saw a "favorable influence upon the total course of the disease." This method of Aufrecht's has been designated the "specific late treatment of pneumonia with subcutaneous injections of quinine." The "early treatment of pneumonia with intramuscular injections of quinine" was begun by A. Cahn and has recently been given a very careful trial by C. E. Cahn-Bronner, who believes that the course of pneumonia can be definitely shortened by early intramuscular injections of quinine.

Meanwhile, on account of the earlier clinical studies with quinine and on account of the influence of quinine and quinine derivatives on trypanosomes, Morgenroth and Levy, (1911) undertook the chemotherapy of bacterial infections and recommended the use of an especial quinine derivative, namely ethyl-hydrokyprein, or optochin, as a most suitable chemical for the treatment of pneumococcus inflammations in man. Since 1911 many studies have been made both of the optochin treatment of pneumonia and of the quinine treatment of pneumonia.

Optochin kills pneumococci in vitro. If it be injected into the peritoneal cavity of mice

thirty minutes before inoculation with what is ordinarily a fatal dose it will save the lives of a large percentage of them. Morgenroth and Levy undertook experiments to see whether or not optochin is useful in human pneumococcus infections and whether doses sufficient to be effective against the infection can be used without injury to the organism. Their results have been controlled by a number of clinicians in Europe and in America. Most of the clinical reports are against the use of optochin because of the danger to the eyes. Its use was forbidden in military service in Germany during the great war.

In this country a critical study of the matter was made by Moore and Chesney, (1918); they too felt that they dare not recommend the use of optochin for the routine treatment of lobar pneumonia. The whole matter has recently been reviewed by Cahn-Bronner in the *Ergebnisse der innere Medizin*. (1922).

It would appear to be true that, in a certain proportion of cases, lobar pneumonia may be shortened or even aborted by the use of optochin, that the general state of the patient can often be improved and that the mortality rate can be somewhat diminished. Though the results have been, on the whole, disappointing, they are still noteworthy. The best method of administering optochin is that of Mendel who gives optochin base in five doses of 0.3 grams or in six doses of 0.25 grams per day; the total daily dose not exceeding 1.5 grams. Mendel thinks it important also that optochin be given along with a pure milk diet, which is continued through both the day and the night. If optochin be given in this way there seems to be very little danger; a fairly steady absorption is arranged for. It is interesting that optochin has a specific effect upon pneumococci but no effect upon streptococci, whereas the reverse is true of eukupin.

The best way of administering quinine is, according to Cahn-Bronner, to give 0.5 grams in 5 cc. of a solution made up with urethane. The formula of the fluid is as follows: quinine muriate 2.0; urethane 1.0; distilled water ad. 20.0. Of this solution, 5 cc. contain 0.5 gram of muriate of quinine. Quinine thus injected is not too concentrated, an objection that has been raised against the use of Merck's ampoules of chininum dihydrochloricum carbamidatum (0.3 and 0.1 gram) though these ampoules are very convenient for carriage by the general practitioner. The preparation,

however, sometimes produces painful infiltrations at the site of injection, and so the more dilute solutions of quinine urethane are to be preferred.

Cahn-Bronner recommends injection of the quinine-urethane solution into the muscles of the thigh. It is important (1) to use a sterile quinine solution that contains no acid, (2) to use a glass syringe freshly boiled (without addition of soda), (3) to disinfect the skin and (4) to avoid moistening the injection needle on the outside with the quinine solution. If these precautions are taken there will seldom, it is claimed, be necrosis or abscess formation.

The adult single dose is 0.5 gram of muriate of quinine. Larger doses are, it is asserted, no more efficacious. The first injection is made as early as possible after the chill, and, if the fever does not fall within twenty-four hours, the injection is repeated. One then waits forty-eight hours and, if the crisis has not occurred, then gives a third injection of 0.5 gram, so that a total amount of 1.5 grams is injected within four days.

Though a careful study of statistics indicates that only about 3.7% of control cases show a cessation of the fever within four times twenty-four hours after the initial chill, on quinine therapy (in 188 cases) no less than 55.5% became fever-free before the end of the fourth day and 25% had aborted within 12 hours after the first injection. The mortality rate reported by Cahn-Bronner was only 6.4% for the cases treated with quinine, whereas in contemporaneous control cases, even after removing from the statistics patients who had entered the hospital moribund, the mortality was 20%. Among the patients that received their quinine injections within the first three days of the disease the mortality was only 5.7%. There was noticed also a marked improvement in the general state of the patient (circulation and respiration). In pneumonias, other than those of pneumococcus origin, it is said that quinine therapy produced no favorable effects.

A comparison of the effects of quinine with those of optochin in lobar pneumonia of pneumococcus origin showed the following results:

Early defervescence with parenteral quinine therapy 55%; with optochin therapy 33.6%.

Mortality, when treatment was given during the first three days, with quinine 5.7%, with optochin 9.5%; in all cases, early and

late, with quinine 6.3%, with optochin 13.4%.

The conclusion reached, therefore, was that quinine therapy was just as efficacious, indeed, somewhat more so than optochin therapy and, moreover, quinine therapy is free from danger to the eyes.

The way in which quinine acts is not, it is admitted by Caln-Bronner, understood. It certainly has no direct pneumococcidal effect, but its action is believed none the less to be specific.

Though even with the use of quinine and optochin the mortality rate in lobar pneumonia is still high, nevertheless the reduction indicated by the statistics given would make it seem worth while to make a trial of the quinine therapy, at any rate until sufficiently large numbers of cases have been treated in different epidemics and in different places (with adequate control) to establish the value or the worthlessness of the remedy. It is conceivable, too, that further experimental work may yield a quinine derivative that is even more efficacious than any thus far tried. Results of quinidin in the treatment of auricular fibrillation indicate how important it is to find the exact chemical constitution that is best suited for a specific therapeutic purpose. Until the proof has been brought, however, that quinine or some quinine derivative has, in reality, a specific effect in lobar pneumonia, let us remain sceptical, bearing in mind the fate of the long series of attempts at systematic therapy of this disease in the past.

1035 North Calvert Street.

INTRADURAL SURGERY IN ITS RELATION TO ABSCESS OF THE BRAIN.*

By WELLS P. EAGLETON, M. D., Newark, N. J.

Operations for brain abscess originating from the ear and the nose give much better results than operations for brain tumors, as far as the actual curing of the patient and his restoration to usefulness is concerned.

If we drain an abscess, experience has shown that the patient is apt to be almost, if not completely, restored to health; but in the nature of the disease, being a suppurative process, the operative mortality must be higher than that of tumors; that is, not immediate death, but death within a period that is in direct relationship with the operation itself, be it one week or three months. As long as the sup-

uration is not controlled, the disease for which we operated has not been eliminated.

When a brain abscess originates from the ear, the suppuration enters either from direct extension of the infection passing through the dura or from a retrograde thrombophlebitis of a cerebral vein. In the first instance, the abscess is always situated contiguous to the area of bony caries; in the second, the abscess, while within the cerebral substance, is adjacent to the area of the primary bony involvement; the internal surface of the dura not being affected, there is no adhesion between it and the cortex. In the former case, as the dura is involved from direct extension of the suppurative process, there are adhesions between the brain and the dura.

CLASSIFICATION: *Adjacent (Secondary).** These two types of abscess, because of their location, I have designated as Adjacent (Secondary); adjacent because the abscess is invariably situated adjacent to the primary focus, and secondary because the intradural pathological process is secondary to primary infected process in the bone.

If the process is from direct extension, there may be a tract leading directly through the dura, into the abscess itself. This is an abscess with a stalk. When, however, it originates from a thrombophlebitis, there is no stalk in the earlier stages of the disease, but later there may be, as a stalk may develop from the growth of the abscess outward.

Intercurrent (Tertiary) abscess of the brain, either of the temporosphenoidal lobe or cerebellum, may originate from a previous thrombophlebitis of one of the large venous sinuses, the infection having involved first the sinus (as an infective thrombosis of the lateral sinus) and from this extended out into the brain substance by way of one of the veins entering the sinus.

This type of abscess may be situated in any part of the brain, at a considerable distance from the primary focus of infection of the bone. I have designated this type Intercurrent (Tertiary);* intercurrent because the pathological process is carried by blood vessels, and tertiary, because the abscess really follows a secondary suppurative process of one of the large sinuses, which latter was the result of the primary otitis or nasal sinusitis.

Metastatic. In addition, we have metasta-

*Read by title before the Virginia Society of Oto-Laryngology and Ophthalmology at Richmond, April 18th, 1923.

*Eagleton, W. P., Brain Abscess. Its Surgical Pathology and Operative Technic, 1922, Macmillan Co.

tic abscess, in which the abscess originates from the bloodstream itself, being caused by nidus, liberated from an infected area, passing into the circulation and being deposited in one of the small cerebral veins. Metastatic abscesses originate not from arterial emboli, but from venous emboli—that is the nidus is deposited in a small vein where the ebb and flow of the blood and the low pressure of the blood is favorable to the development of a vascular occlusion followed by an infective thrombophlebitis and abscess.

This classification is of importance because it is clinical. it can be helpful in deciding the position of the abscess giving rise, as adjacent, intercurrent and metastatic abscesses do, to absolutely different symptoms during invasion.

OPERATIVE APPROACH: Although an adjacent abscess of the temporosphenoidal lobe is generally easily located surgically and evacuated, at least partially, the operation itself is only part of our surgical problem.

In intercurrent abscess, on the other hand, with our present methods of localization, both clinical and surgical, the position at operation generally cannot be accurately determined. This is especially true in cerebellar abscess as, in an analysis of a large number of cases of post-mortems of abscess of the cerebellum, we have found that the position of the abscesses varies greatly.

However, cerebellar abscess can generally be located by multiple brain punctures. If the only thing necessary were to find the abscess, undoubtedly this could be accomplished in the majority of cases through a small dura exposure.

In cases of abscess of the temporosphenoidal lobe this is especially true, because all of the adjacent abscesses are situated directly over the tentorium, while those of the frontal lobe present even less difficulty, as they almost invariably lie directly behind the frontal sinus. The surgeon is usually able to puncture the abscess after taking away the posterior wall of the frontal sinus.

FACTORS TO BE PROVIDED FOR BEFORE ENTERING THE DURA; COMPRESSION AND CEREBRAL DISPLACEMENT: But the location of the abscess is only the beginning of the surgical problem. The number of abscesses that have been evacuated at operation is very large, but the number that have recovered after location is comparatively small.

An important factor in the surgical treatment of brain abscess that must be planned for before opening the dura is subsequent cerebral compression. Secondary cerebral compression enters only to a limited degree into the post-operative treatment of brain tumors. In brain tumors, edema from the trauma may be met by lumbar puncture, intravenous administration of hypertonic salt solution, or magnesium sulphate by the stomach; and, while the edema may recur once or twice, it will ultimately subside as the compression itself has no influence on the subsequent condition of the brain if its immediate effect can be tided over.

Compression in suppurative diseases of the brain is a different process. If we examine the post-mortem records of brain abscess that have died after being evacuated through a small dural opening, we find that the abscess (or the area of suppurative edema) has extended, and that the cortex over the abscess, between it and the dura, is discolored. In other words, the areas of the brain adjacent to the abscess have begun to be gangrenous; the abscess has extended. This is a pathological fact, the importance of which is not as generally recognized as it should be.

We must prevent, if we can, this lighting up, by the operation, of an encephalitis in a region that is not already infected. To meet this condition before exploration, we should plan a bony flap large enough to be able to see a large area of the cortex and to explore it with the least amount of damage, thus preventing as far as possible a subsequent increase of the intracranial contents by a secondary edema.

These factors can only be met by large bone flaps and large dural openings. Whenever I have deviated from this principle I have invariably regretted it; and although with it many of my cases have died, I still feel the principle is right and that it should be adopted in every case. Without it I have lost several cases which, from the pathological condition and the position of the abscess as found at post-mortem, would have recovered.

In cerebellar abscess, to be able to see every part of the cerebellum, the incision must extend from one mastoid to the other and down the median line of the back of the neck; both flaps turned back, the whole cerebellar region explored, the bone removed and the sinus of the affected side obliterated; after which the dural incision extends from one mastoid to the other. Before opening the dura, a ventricular

puncture must be performed; the whole cerebellar fossa can then be explored and the abscess located with the least amount of trauma to the brain tissue.

Here I want to say a word about the dishonesty of the reports that occur in cerebral surgery. The books are full of statements of which the authors have little knowledge whatever and no experience. This was demonstrated not long ago in looking over a book on surgery in which I found a plate of an osteoplastic flap of the cerebellum that was devised years ago by a European surgeon, on anatomical grounds; he published it. Few cases could possibly recover from the operation for such a flap in the presence of increased intracranial pressure; the patient would die from hemorrhage during its performance. Yet, this description has been repeated in many books. It seems to me it is time that this copying without verification were stopped, for the good of medicine.

In temporo-sphenoidal lobe abscess an osteoplastic flap must be made, also in frontal lobe abscess. This exposes the dura completely. During this exposure there is apt to be some hemorrhage because the increased intracranial pressure causes the blood to leave the head by the diploic vessels instead of through the normal return venous channels.

The excessive increased intracranial pressure, so frequently encountered in brain tumors is never present in brain abscess, because of the nature of the lesion, yet we have increased intracranial pressure. A tumor is a slow growing process and by the slowness of its growth it gives the brain tissue opportunity to readjust itself. An abscess grows more rapidly and, because of its acute growth and its suppurative nature, can never reach the size often attained by tumors, without killing the patient.

An abscess destroys a part of the brain tissue by suppuration and does not add as greatly to the total bulk of the contents of the dura as brain tumors. Consequently we do not have the excessive bleeding from the skull in brain abscess operations that occurs in cerebellar tumor operations. The dread that I have always had of the profuse bleeding, so frequently seen in cerebellar tumor, has not been warranted during exposure of the dura in brain abscess.

It is after exposure of the dura that the chief surgical problems are presented, for we must prepare for the subsequent compression from

increased intracranial pressure that is apt to follow the operation.

It may be asked "if a lumbar puncture relieves the increased intracranial pressure, why is not this a simple way in brain abscess?"

LUMBAR PUNCTURE, ITS DANGERS: We are so in the habit of performing lumbar punctures and they are apparently so free from accident that we have become careless. A lumbar puncture on a normal individual, or an individual suffering from a degenerative disease, syphilis, meningitis, or a lateral sinus thrombosis (any condition in which the pressure, even though increased, is evenly distributed over the whole of the cerebrospinal fluid circulatory system), does not give bad results, although now and then a prolonged reaction occurs for which we cannot account. But in any condition of increased intracranial pressure from an *increase in the brain bulk* itself, a lumbar puncture is dangerous, and in my experience has actually caused a number of avoidable deaths.

It has long been known that abscess of the brain, even without lumbar puncture, is not infrequently followed by a sudden fatal termination. The same thing happens in brain tumor. The explanation usually offered has been that the respiratory centre has been herniated through the foramen magnum, causing paralysis of respiration. An intracranial death is always a blue death.

CEREBRAL DISPLACEMENT: I accepted this theory until my attention was called to the frontal lobe abscess as well as the occipital lobe abscess that dies suddenly, neither of which can cause medullary herniation. Post-mortem examinations demonstrated to me that the cause of death is frequently not from prolapse of the medulla alone. The explanation is that increased intracranial pressure from abscess or tumor is associated with displacement of brain substance itself which, if further altered, causes hemorrhage into the vital centres. The death may not be sudden.

Normally the brain is held together by the pia-arachnoid as in a bag. Its shape is preserved by the vessels running through it; they are very elastic and firm. In a case of gangrenous cerebral herniation, after some of the disorganized brain tissue has been removed by irrigation, I have seen the free vessels remain, some over an inch in length, still very elastic. They could be stretched an appreciable distance.

In increased intracranial pressure from a *localized lesion* such as abscess or tumor (especially in cerebellar abscess), the vital centres are displaced away from the median line,—away from their normal position. In this displacement the blood vessels are also displaced. On account of their elasticity they stretch. This is possible without hemorrhage, because it occurs gradually, hour by hour, day by day, the process being a slow one. To this alteration in the position of the intracranial contents they adjust themselves. Nevertheless, they are abnormally placed, they are under stress; if now a surgeon does an operation and suddenly opens the dura, if extreme cerebral herniation occurs, the delicate vessels may rupture. For some reason the vessels of the pons apparently are the ones that most frequently rupture, and from the branches of the basilar artery hemorrhage also occurs. If the hemorrhage is extensive, there is immediate death; if not, a long period of Cheyne-Stokes respiration with semi-cama and then death.

I believe that nobody has called attention to this condition prior to a communication which I presented before the International Otological Congress last summer.*

If the surgeon performs a lumbar puncture in the presence of cerebral displacement with increased intracranial pressure from an abscess or tumor, he causes exactly the same thing. There is now a combination of suddenly lowered pressure from below, allowing the brain to be herniated through the foramen magnum. At the same time he has altered the already abnormal position of the cerebellar contents, which may cause pontine hemorrhage.

Lumbar punctures in brain tumors or brain abscess have been in my experience attended by several unpleasant surprises. But we should attempt to lower the intracranial pressure before we open the dura, because we may have uncontrollable cerebral herniation. To accomplish this a ventricular puncture may be performed.

VENTRICULAR PUNCTURE: Judging by my experience, ventricular puncture sometimes is different. In supratentorial lesions it is often impossible to locate the ventricle on the side of the lesion, as it may not exist, being obliterated. The opposite ventricle may be either large or small.

When the lesion is below the cerebellum, the ventricles are generally more or less distended and can easily be located.

I have encountered other technical difficulties in ventricular puncture. Once on making a little opening in the dura through a trephine opening there occurred a gush of blood. I plugged it with wax, and it stopped. Whether or not in making the little nick through the dura I cut into a small pial vessel that was immediately crowded into the hole, I cannot say. In another case of increased intracranial pressure I had a loop of pial vessel protrude from the small opening. I "clipped" and replaced it without difficulty.

To reduce the increased intracranial pressure, it is desirable before opening, to give the patient magnesium sulphate by mouth; or an intravenous injection of hypertonic salt solution during the operation.

The combination of ventricular puncture and intravenous injection of salt should allow the dura to be opened with safety, the brain examined, the tract, if there is such, found, and the abscess evacuated through this tract. It may be necessary to perform a lumbar puncture, but we must realize the danger we are running.

DRAINAGE: The question of drainage, to my mind, is one of the most important, next to the exploration itself. All text-books recognize this, but few state that the drainage of abscess, of otitic or nasal origin, must vary according to whether the abscess is chronic with a capsule or acute without a capsule. It is not so much a question of the kind of drainage, as it is of the type of abscess in the given case.

If we have an acute intracerebral abscess without a capsule, we should be decided before we start that we probably will not drain. Our chief object should be to evacuate the abscess; to liberate the pus that is in the cavity of the abscess. There is nothing more to be done. This will horrify many but it is according to surgical principles, for, after the infection has been eliminated as far as possible, to put drainage material into an acute intracerebral abscess without a capsule is simply to place an irritant to the brain which will favor a continuation of the suppuration. Later if the abscess refills, a capsule having been formed, drainage material will have to be introduced.

If you have a chronic abscess with a capsule, it is a different matter. Here an effort should be made not to simply drain, but to eradicate

*Eagleton: "Technical Considerations in the Treatment of Cerebellar Abscess." Trans. 10th International Otological Congress, Paris, 1922.

the suppuration. The whole of the interior of the abscess being cut off, as it were, from the normal brain tissue, it should be cleansed and, as it is obliterated by the pressure of the surrounding tissue, we place drainage material in it. A piece of greased rubber tissue will allow drainage with the least amount of irritation. I have tried fascia lata but, as dead fibrous tissue favors suppuration, I had to remove it on the second day. I believe the carotid artery of a dog would be a good material as it resists suppuration, and would furnish a channel through which to irrigate, if necessary. I have not tried it.

CLOSURE: If we leave the dura widely open, we will lose the case because the piaarachnoid must be protected from injury; so it must be closed tightly, except for the smallest possible opening through which the brain protrudes.

AFTER TREATMENT: I think that the most important thing I have learned during the past year about abscess of the brain is that, if we are to give the patient even a fair chance to recover, the care after operation demands the same forethought and attention to details with which the operation was prepared and performed.

How can secondary compression be foreseen and recognized? Ophthalmoscopic examination should be made at frequent intervals. In but a few cases has the fundus picture been of assistance to me, but in these few cases it has been of the greatest assistance. I do not believe that papilloedema is caused by compression alone, but I do believe that it may be the earliest sign of compression. If a papilloedema appears *after operation* we should be on the lookout; something is wrong. The blood pressure should be taken every fifteen minutes. A rising systolic pressure demands attention. A rising pulse pressure is of grave significance.

If coma deepens, we are justified in performing a ventricular or a lumbar puncture. Meanwhile an intravenous injection of salt or the administration of a solution of magnesium sulphate by mouth may keep the edema down.

TRAINED TEAM WORK NECESSARY: Brain abscess should be handled only by a team who are trained to do this work. In every hospital in which there are a large number of cases of traumatic cerebral injury, there should be a special service.* To them should be turned over all head cases on every service. Today I

have two assistants, who always help me, an expert anaesthetist who has had experience in head cases, and one trained nurse,—that is a team of five trained people. We are still short one person, as there is frequent need of an assistant to cut a piece of fascia lata or to perform a blood transfusion.

When we think of the many difficulties that may be encountered, it is readily seen that only by team work can we possibly give the patient the best chance. For myself, I will not perform an intracranial operation outside the hospital in which I routinely do this work. I feel that to operate on intradural cases elsewhere is taking an unnecessary chance that may be disastrous to the patient. I am perfectly willing to operate on a patient in deep coma from a brain abscess or trauma in other hospitals. They have at best a poor prospect of recovery, and to remove them might invalidate this. But in cases in which the patient is not in coma, I insist that they be brought to the place where the team works.

RESULTS: From the text books one would think that from fifty to seventy per cent. of brain abscess recover. But all large compilations of cases show that less than fifteen per cent. of all the cerebellar, and less than forty per cent. of all the temporosphenoidal lobe abscesses have recovered. Even this, in my opinion, is too high, because it takes a great deal of courage to report successive failures, while every successful case is so brilliant that it is sure to be reported.

PROGNOSTIC SIGNIFICANCE OF MULTIPLE LESIONS: It is a clinical fact that the greater the number of lesions present at the time of operation, the less the hope of recovery. A sinus thrombosis prior to the formation of brain abscess is a predisposing cause of death, although the mortality from it alone is not high. An associated meningitis almost invariably terminates fatally, although a few cases have recovered, but the association of sinus thrombosis, brain abscess and infective meningitis offers little hope of the patient's recovery, even though the abscess is evacuated. Deep location of the suppuration, or acute abscess, and encephalitis, all are unfavorable conditions. We know that even if the abscess has been properly evacuated, the patient is apt to die. In any case the patient has but one real chance; we cannot afford to lose a single technical trick during or after the operation.

15 Lombardy Street.

*Eagleton, W. P. "Operative Treatment of Suppurative Meningitis by Subarachnoid Irrigations." Second paper. Atlantic Medical Monthly. June 1923.

RECENT ADVANCES IN THE DIAGNOSIS AND TREATMENT OF SYPHILIS.*

By WARREN T. VAUGHAN, M. D., Richmond, Va.

The serologic study of syphilis has become so extensive that in large medical hospitals and clinics the Wassermann reaction has been made practically routine. Coincident with the development of routine tests for syphilis, clinicians have come to rely more and more upon the laboratory for their diagnosis and have neglected the methods of physical examination and analytic diagnosis. In the past when syphilis was suspected, a thorough search was immediately instituted for any and all signs or stigmata suggesting this disease. How much easier it is to await the laboratory report and thereupon establish or eliminate syphilitic infection!

Not only is routine laboratory technic not infallible, but furthermore, there are without doubt not a few cases with truly negative Wassermann reactions. These cases will be misdiagnosed if too great reliance is placed upon the laboratory examination. Pride in one's ability to recognize disease should impel one to make a thorough examination and to establish the tentative diagnosis, even before receipt of the laboratory report. If the report is then found to be at variance, it is still possible that the laboratory is in error. It is then that judgment, that rare virtue so necessary to the diagnostician, becomes of paramount importance.

Perhaps the condition most frequently met with, in which the patient although actively syphilitic shows a negative blood Wassermann, is chronic advanced syphilis of the central nervous system. Here the spinal fluid will usually show a positive reaction.

Marcel Pinard describes a case with multiple, painful exostoses without signs of syphilis and with a negative Wassermann and Hecht reaction, but which subsequent events showed to be a case of heredosyphilitic infection. The initial symptoms appeared at the age of 22, following trauma. As the exostoses became more numerous, syphilis was suspected and the blood was tested and found to be negative. The spinal fluid Wassermann was also negative. Under antisyphilitic treatment the symptoms rapidly disappeared.

The same author has recently reported an even more interesting case. A pregnant

woman of 35, with headaches, facial paralysis and albuminuria, presented herself for diagnosis. Syphilis was suspected and a Wassermann was done on three occasions, and by three different serologists, each time with negative results. The woman at term gave birth to an infant showing all of the classical signs of congenital syphilis, with skin eruption, snuffles, etc.

Two children from a previous marriage were examined and in both were found the characteristic signs of heredosyphilis.

This woman had suspected syphilis before her second marriage and had consulted a physician who made blood tests and then informed her that she was "une malade imaginaire." The patient remarried, therefore, with medical sanction, and continued to produce hereditarily syphilitic children.

Pinard draws attention to the unfortunate circumstances resulting from a medical attitude of mind which depends entirely upon the result of the Wassermann reaction for guidance, and emphasizes the importance of searching for evidences of syphilis among other members of the family, a search which often furnishes information which the serologic reaction withholds.

The value of the Wassermann reaction in serologic diagnosis is unquestioned, but the method is not without its real disadvantages. The various ingredients entering into the complement fixation reaction must be titrated with the utmost precision. Antigens are known to be variable. Complement tends to deteriorate with relative rapidity and since the interpretation of the test depends upon the disappearance of complement activity, its deterioration may be mistaken for fixation. Again, serum is occasionally either wholly or partially anticomplementary. Furthermore, many sera contain a natural hemolysin, the presence of which leads to erroneous negative conclusions. These and many other technical difficulties undoubtedly explain why, in spite of the fact that the Wassermann reaction has now been in use more than fifteen years, it is not, as yet, wholly dependable.

The fact that alcoholic extracts of non-syphilitic organs may be used in the test has discredited the specific antibody conception of the reaction. It is chiefly this fact that has inspired recent attempts to simplify the technic. The earlier interpretation of the Wassermann reaction as an antigen-antibody re-

*Read before the South Piedmont Medical Society, Danville, Va., April 18, 1923.

action has been questioned and it has been suggested that the phenomena observed are based on colloidal reactions. In 1907 several investigators suggested that a precipitate is formed in the positive Wassermann test and Jacobstahl showed with the ultramicroscope that such a precipitate actually is present when a mixture of Wassermann antigen and syphilitic serum is incubated for one and one-half hours. Attempts to produce a visible precipitation as indicative of syphilitic infection were first successfully carried out by Lange who developed the colloidal gold reaction. Of the ten or more precipitation or flocculation reactions that have been more recently described, the Meinicke, the Sachs-Georgi and the Kahn reactions have, because of their relative simplicity and because of their high correlation with the Wassermann test, received especial attention and study.

It has been shown that the globulins in syphilitic serums and spinal fluids are increased above the normal, and the precipitation occurring in the various tests is supposed to be a reaction between seroglobulins and lipid extract such that the resulting flocculate is a lipoglobulin aggregate. The Sachs-Georgi reaction is one of the simplest so far proposed. The technic consists in the incubation for from eighteen to twenty-four hours of a mixture of inactivated serum, sodium chlorid and cholesterinized heart extract. A positive reaction usually occurs at the end of that time although the tubes are customarily allowed to remain at room temperature overnight, when a second reading is taken. The test has been compared with the Wassermann reaction in over thirty-one thousand cases and in the aggregate there was an agreement of 86.9% in all tests performed by various workers.

The main difficulty with both the Meinicke and Sachs-Georgi reactions lies in the fact that the end results are read after forty-eight hours incubation, at which time the serums frequently show sufficient contamination to lead to false interpretations. The Kahn reaction is read after a much shorter interval and is even further simplified. In it the final precipitate is easily seen with the naked eye and in strongly positive serums spontaneous flocculation occurs, enabling interpretation as soon as the reagents are thoroughly mixed. Serums are mixed with small amounts of diluted cholesterinized antigen and with non-

cholesterinized antigen and the mixture is then vigorously shaken for three minutes. Sometimes at the end of this period a positive reading may be had, although as a rule readings are made after incubation overnight. The possibility of standardizing this type of reaction is increased by the fact that only one reagent is added to the serum. Young, in reporting a comparison between the Kahn and Wassermann reactions in five thousand and eighty serums, found an agreement of 93.03 per cent. between the two reactions.

Serologic examination for the presence of syphilis has become so generally relied upon that any method which will increase the accuracy of the test should be utilized. Standardization of the original test is of the utmost importance. Other simpler reactions such as the Kahn and Sachs-Georgi test may be used for confirmatory evidence. It may be that ultimately some simpler flocculation reactions will entirely supplant the Wassermann test. In the meantime, it must be borne in mind that the mechanism of none of the reactions is accurately known. We cannot explain why in syphilis and in practically no other disease some change has been produced in the blood serum by which the precipitation reactions will become positive.

When salvarsan was introduced into the medical world, the details of its administration had been already worked out. Ehrlich, after having chemically perfected the spirocheticide, had had its action tested on thousands of individuals in several of the best German clinics, so that when the treatment came into general use the experimental phase had been passed, and the dosage and manner of administration had already been worked out in detail. In this way unfortunate accidents in the hands of inexperienced physicians were to a great extent avoided.

Nevertheless, there have been several important and valuable changes in the method of arsphenamine therapy during the last ten years. In the treatment of syphilis, it was soon discovered that the "therapia sterilisans magna," which had been satisfactorily employed in animals, could not be reproduced in man. Our inability to destroy all of the spirochetes in the body with one massive intravenous medication has rendered it necessary to administer repeated doses. The question of dosage in the treatment of syphilis has therefore become extremely important.

Ehrlich, in his original work on trypanosomes, recognized that in those cases not entirely cured by the first treatment, relapses were even more difficult to cure. Treatment which had been unsuccessful in a first attempt was usually unsuccessful on repetition. Repeated treatments, none of which cured entirely, were often found to have progressively less influence on the activity of the infecting parasite. A condition of "Festigkeit," increased tolerance or resistance to the action of the drug, had been produced.

The possible development of "drug-fastness" by the infecting agent, in individuals undergoing antisyphilitic treatment, is now recognized as an important feature and a phenomenon to be avoided if possible.

A contribution of considerable significance has been made recently by Bronfenbrenner and Schlesinger, who found that minute doses of arsphenamine, instead of inhibiting the progress of the spirochetal infection, actually caused the disease to progress more rapidly and more extensively in the animals so treated than in other animals similarly infected but not treated at all. Bronfenbrenner and Noguchi found some time ago that minute amounts of arsenic present in culture media stimulated the growth of spirochetes. Very minute quantities of arsphenamine appear therefore to be of less value than no treatment at all. The phenomenon appears analogous to that found in the treatment of cancer by the roentgen ray, where small doses stimulate the cells to proliferation while larger doses destroy. Bronfenbrenner and Schlesinger point out that this stimulative action of minute doses of arsenical compounds is not to be confused with the development of increased tolerance, but is characterized by an actual increase in the rapidity of multiplication of the parasites.

The dosage used by these investigators is, of course, extremely small and it does not follow from their report that the occasional small doses used therapeutically in the treatment of syphilis have a stimulating action. It is quite probable that even these small doses are sufficiently large that they inhibit multiplication. This is indicated by the customary diminution in the intensity of the positive Wassermann reaction and clinical improvement.

Brown and Pearce have shown in a recent article that insufficient treatment with

arsphenamine or neoarsphenamine may alter the immunologic status in experimental animals to such an extent as to favor the development of a second or superimposed infection without a cure having been accomplished for the first. They inoculated rabbits and, after the development of the primary lesion, treated the animals with single massive doses of arsphenamine or neoarsphenamine. The primary lesions as a rule retrogressed and in some instances disappeared. Reinoculation, at a time when the drug was no longer present in the body in sufficient amounts to produce an effect, and when the original primary lesion had practically disappeared, produced in most of the rabbits a second primary lesion at the site of reinoculation. In the majority of the animals the original infection had not been entirely destroyed and, as the original parasites once again commenced to multiply, chancres developed both at the site of the original inoculation and the site of reinoculation.

It has long been held that individuals once infected with the spirochete of syphilis are immune to reinfection as long as the germ remains active in the body. Reinfection usually is assumed to be evidence that the patient had been cured of the former infection. The work of Brown and Pearce shows quite conclusively that experimentally, at least, an individual may become reinfected with syphilis even though the original invaders are still living in his tissues. Similar phenomena have occasionally been reported in man.

How frequently the factors discussed above will become of importance in the treatment of syphilis is uncertain. Certainly the standard doses in use in the large clinics have proved their worth. But that they are the ideal dosage does not follow. There is a tendency with many to give relatively smaller doses of arsphenamine or neoarsphenamine than formerly. Past experience and recent laboratory observations appear to be of accord in indicating that the dosage in antisyphilitic treatment should be as high as safety permits.

The standard intravenous dose of arsphenamine is 0.6 gm., that of neoarsphenamine 0.9 gm. These quantities appear to be sufficiently large for satisfactory therapeutic results and yet are not so large that they cause untoward results. They contain about equal amounts of arsenic and are supposed to have equal therapeutic value. The majority of critical

observers have found, however, that there is a difference in the effectiveness of the two drugs when given in these doses. Most syphilologists have concluded that arsphenamine produces prompter results and is less liable to be followed by relapse. The popularity of the second preparation is due to the greater ease of administration, a factor which should play a less important role than it actually does. In nearly all of the armies, during the war, syphilis was treated with neoarsphenamine. This was undoubtedly due to the greater ease, and shorter time required for administration, thereby facilitating the treatment of larger numbers of individuals, and to the fact that considerably less apparatus was required. Rightly or wrongly this has given an official sanction to the use of neoarsphenamine.

Considerable experimental work has been done within recent years to determine if possible the comparative value of the two drugs. Schamberg, Kolmer and Raiziss, working with trypanosomes, found that the trypanocidal activity of arsphenamine was 1.74 times that of neoarsphenamine. Castelli and others, working on trypanosomiasis, spirillosis, and rabbit syphilis reached similar conclusions, finding that the activity of the former was between 1.5 and 1.78 times that of the latter. If we are to accept these results we should conclude that: therapeutically 0.6 gm. of arsphenamine is not equivalent to 0.9 gm. of neoarsphenamine, but rather to 1.05 gm. The therapeutic activity of 1.05 gm. of neoarsphenamine is equivalent to that of 0.6 gm. of arsphenamine.

The trypanocidal dose of arsphenamine (*dosis therapeutica*) is 4.564 times less than the highest tolerated dose, (*dosis tolerata*). On the other hand, the therapeutic dose of neoarsphenamine is 6.35 times smaller than the highest tolerated dose. The latter is, therefore, a safer drug, the margin of safety between the two doses being distinctly greater. This is true even if 1.05 gm. instead of 0.9 gm. of neoarsphenamine should be used.

The average *minimum effective dose* for arsphenamine is 3.1 gm. per kilo body weight; for neoarsphenamine, 3.4. These two doses are approximately the same. The *minimum lethal dose* on the contrary is 53.2 for arsphenamine and 96.5 for neoarsphenamine. Once again we see a wider margin of safety in the latter drug. Voegtlin and Smith desig-

nate as the "therapeutic ratio," the ratio M. L. D. For arsphenamine this is 17.2, and M. E. D. for neoarsphenamine 28.4. The higher the ratio, the less danger is there in administering the drug in amounts greater than the M. E. D.

These experimental observations coincide with clinical knowledge that toxic reactions occur less frequently after large doses of neoarsphenamine than after corresponding doses of arsphenamine.

Schamberg, Kolmer and Raiziss have made a study of the relative toxicity of the two drugs. They found that for rats and mice neoarsphenamine is about 2.4 times less toxic than is arsphenamine. They conclude that, as far as is indicated by intravenous experiments on rats, the usual dose of 0.6 gm. of arsphenamine is about 12 times less than the highest tolerated dose, while 0.9 gm. of neoarsphenamine is 19 times less than the highest tolerated dose for the latter drug. Here again the conclusion is that larger amounts of neoarsphenamine are of less danger than are proportionate amounts of arsphenamine.

It is well known that neoarsphenamine may be given with safety at shorter intervals than arsphenamine. Will it not be true then, that if the former drug is administered in slightly larger doses and somewhat more frequently, say 0.9 gm. thrice weekly, equally good therapeutic results will be obtained? This raises a question as to whether the difference in therapeutic results is due merely to a difference in dosage or whether it depends on a chemical difference between the two drugs.

Schamberg concluded from comparative studies that the addition of the formaldehyde sulphonylate group found in the neoarsphenamine may lessen the affinity of this drug for the protoplasm of the parasite, but at the same time lessening the affinity for the body proteins to an even greater extent. This hypothesis would explain both the diminished therapeutic effect and also the decidedly lessened toxicity. Another phenomenon bearing on relative toxicity is the observation by Schamberg that arsphenamine in practically all concentrations hemolyzes red blood cells *in vitro*, while neoarsphenamine does not do so in any concentration clinically employed. Schamberg has concluded that arsphenamine is more active therapeutically but that this advantage is balanced by the much higher toler-

ated dosage of neoarsphenamine and by the fact that the latter is less likely to cause biochemical disturbance in the blood and the tissues.

The preceding review indicates fairly clearly the unsettled status of arsphenamine and neoarsphenamine dosage. At present there is sufficient evidence to justify those who prefer to use the simpler technic of neoarsphenamine therapy, but only on the condition that sufficiently large and frequent doses be administered.

There is some diversity of opinion as to what therapeutic procedure may best be followed in obvious nervous system infection. In general, three views are held. First, that intravenous medication alone produces satisfactory results; second, that intravenous medication should be combined with spinal drainage; and third, that the administration of salvarsanized serum intraspinally produces the greatest benefit.

The performance of spinal fluid drainage after intravenous treatment was originally based on the assumption that with reduced intraspinal pressure the arsphenamine circulating in the blood will diffuse more readily into the subarachnoid space. Dercum claims better results than by the Swift-Ellis method, due he thinks, to the more thorough drainage. Every possible drop of fluid is removed each time. Theoretically, the rapid removal of fluid will produce a relative hyperemia of the cord and brain with resulting improved nutrition to the parts. Dercum draws an analogy to the Bier method of hyperemia as used in surgery. If his theory is true, drainage alone, irrespective of intravenous treatment, might improve the nutrition of the central nervous system with resultant spontaneous improvement.

The presence of arsphenamine in the spinal fluid, according to Dercum, is of no significance and probably plays no part in the good results obtained. The difficulty in syphilitic medication lies not in the failure of passage of the spirocheticide through the choroid plexus into the subarachnoid space, but in its failure to pass through the walls of the capillaries situated in the nervous tissue, into the parenchymal cells where the chief damage takes place. The hyperemia resulting from spinal drainage would increase any such tendency to pass through the capillary walls.

Fordyce, who is an ardent advocate of the

Swift-Ellis method of treatment, takes vigorous exception to Dercum's conclusions. He points out that Swift and Ellis did not develop their method under the mistaken idea that the nervous system received its nutrition from the spinal fluid, but rather because intraspinal therapy had been successfully employed in the treatment of cerebrospinal meningitis. Many forms of neurosyphilis have their site in the meninges and are limited to these structures. Meningovascularitis cannot always be differentiated clinically from paresis and in most cases of true paresis there exists at the same time a meningitis. Positive spinal fluid findings in central nervous system syphilis are due usually to meningeal involvement and this can best be treated by the direct application of a spirocheticide. The more pronounced the luetic meningitis, the more marked will be the benefit derived from intraspinal medication. Fordyce states that numerous cases have been entirely cured and many greatly benefited by Swift-Ellis treatment after the failure of those methods so strongly advocated by Dercum and others. Numerous cases of progressing optic atrophy have been permanently arrested by intraspinal medication after the failure of prolonged intravenous treatment.

The prevention of late neurologic accidents in syphilis does not depend solely upon a recognition of early invasion. The theory that inadequate treatment predisposes to late nervous involvement has been discussed in some detail by Keidel. Little is known with regard to immunity in syphilis but we have considerable indirect evidence that the human body does develop some degree of immunity against the *treponema pallida*. The observation of Colles regarding the apparent immunity of the pregnant mother and that of Profeta, that a "non-syphilitic" child born of syphilitic parents appears immune, were the first observations based on such a conception. As a rule a syphilitic cannot be superinfected. Pearce and Brown have shown experimentally that insufficient treatment will destroy this immune mechanism and that a second chancre may then be produced even while pathogenic microorganisms persist in the first. They have proposed two "laws," both of which aid in an understanding of late neurosyphilis following inefficient treatment. According to the "law of progression," various tissues of the body are not equally susceptible and reactive to

syphilitic infection. Some groups are more susceptible than others, and with a progressing infection there is an orderly sequence from one group to the next. Interference with the course of the infection, as by treatment, may protect some tissues, but unless persisted in may fail to protect tissues higher in the scale. Reidel observes that certain tissues with relatively high resistance to invasion show little defensive reaction after finally becoming involved. If these observations are applied to the central nervous system, the latter tissue may be considered relatively insusceptible to invasion with the spirochete, and at the same time unable to satisfactorily develop an immunity reaction when it does become so invaded. Thus the nervous system must depend for its protection upon the presence of immune bodies derived from other tissues. With destruction of the treponema, the general immunity reaction becomes less vigorous and the nervous tissues more easily fall prey to the invading parasite.

The second law formulated by Brown and Pearce, "the law of inverse proportions," assumes an inverse quantitative relationship in the intensity of consecutive reactions in syphilitic infection. Thus in the primary sore, a defense reaction is set up. If this is vigorous and the chancre is extensive, the later manifestations are likely to be milder if they appear at all. Conversely, with a small, non-reactive chancre, the secondary and tertiary phenomena are usually more extensive. It has long been observed that in secondary syphilis with extensive cutaneous manifestations, central nervous infection is less apt to occur, whereas with but slight cutaneous involvement, later neurosyphilis is more frequent. Treatment which mitigates the severity of the primary and secondary reactions without completely eliminating the infection may predispose to involvement of those more highly resistant tissues such as the central nervous system.

Thus we may use the term accurately when we speak of prophylactic treatment of neurosyphilis. The efficiency and completeness of treatment of the primary and secondary lesions appears to be of considerable importance in determining later neural infection.

The weight of evidence indicates that intraspinal administration of salvarsanized serum has a distinct field and should be employed in all cases in which intravenous treat-

ment has not satisfactorily cleared up the central condition. For satisfactory results intraspinal treatment must be begun early. Tabes and taboparesis when usually recognized are past cure and usually past improvement. The future hope of therapeutic advancement in this field consists in early recognition of neural involvement and intensive treatment before the appearance of localizing signs or symptoms. The routine which I have followed consists in the giving of an initial course of intravenous therapy, followed by re-examination of the spinal fluid. If improvement is noted, the method of treatment is not changed. If no improvement in the spinal fluid findings has occurred, intravenous treatment is reinforced by intraspinal therapy, using the Swift-Ellis technic. In cases of early secondary syphilis it is safer to give three or four intravenous treatments before performing the initial lumbar puncture, so as to lessen the hazard of meningeal invasion subsequent to the puncture itself.

A negative blood Wassermann does not rule out central nervous system syphilis, even in those cases who have had no anti-luetic treatment. In case of doubt, a diagnostic lumbar puncture will give valuable information. The intrathecal pressure should be roughly estimated, cell count and globulin content should be recorded, and Wassermann reaction should be determined. I have also been employing the colloidal gold reaction as a control for the Wassermann. It is important to use amounts of fluid up to 2 c.c., in the Wassermann test, so that a weak positive will not be overlooked.

No case of syphilis can be said to be successfully protected against late neurosyphilis until the spinal fluid has been studied and found to be normal.

Early treatment of neurosyphilitic lesions, before the development of localizing signs, offers the only promise, at present, of satisfactory therapy. Spinal fluid examination affords the only means of recognizing this early involvement.

Every syphilitic should have at least one lumbar puncture performed, early in the course of his disease.

The use of bismuth in the treatment of syphilis was developed in France chiefly through the efforts of Sazerac and Levaditi, who recognized the value of the earlier uncompleted work of Sauton and Robert of the

Pasteur Institute. The preliminary observations made by Sauton and Robert were published in *Annales de L'Institut Pasteur* in 1912. No further experimental work was performed until after the war when, in 1921, Sazerac and Levaditi published their preliminary observations. In January, 1922 a symposium on the use of bismuth in the treatment of syphilis appeared in the *Annales de L'Institut Pasteur*. Between January and December, 1922, twenty-seven articles on the use of bismuth in syphilis have been recorded in the *Quarterly Cumulative Index*, coming from the following seven countries: Argentina, Denmark, Italy, Brazil, Uruguay, Germany and Switzerland. During the same period the treatment was not discussed in the American medical press.

Fournier and Guenot have collaborated with Sazerac and Levaditi in the clinical use of sodium-potassium-tartrobismuthate. They give the drug intramuscularly in a 10 per cent. suspension in olive oil and emphasize the importance of depositing it into the muscles rather than subcutaneously. The latter method is decidedly more painful while the inconvenience from intramuscular injection is no greater than that observed after intramuscular mercury. A total of two or three grams of bismuth should be given during the first month of treatment. Two or three injections of 0.2 grams are given daily, after which the patient receives 0.3 grams twice weekly throughout the month. After this period, treatment may be continued with weekly injections of 0.2 to 0.3 grams or the patient may be allowed one month rest, after which the regular course is repeated. The only necessary precaution for the patient to observe is a careful hygiene of the mouth.

Under this treatment spirochetes disappear from the primary sore after the first to the third injection. The chancre becomes completely healed within five to twenty-five days, usually within two weeks. The Wassermann reaction, if negative at the initiation of treatment, usually remains so. If positive, the strength of the reaction falls as satisfactorily, or perhaps more so, than after the use of arsphenamine.

Bismuth is particularly useful in the contagious stages and, according to the authors, causes more rapid and complete disappearance of the contagious lesions, than does arsphenamine. In secondary syphilis the cutaneous

lesions disappear as a rule within a week. The strength of the Wassermann reaction is very favorably influenced, becoming practically negative within two or three months as a rule, but varying considerably as with other forms of treatment. Tertiary lesions improve with almost equal rapidity. This is particularly true of gummata and tertiary skin and mucous membrane manifestations. The authors report no conclusive observations on visceral or nervous syphilis.

No untoward effects from the use of bismuth have been reported other than a tendency toward stomatitis similar to but usually not as severe as that following the use of mercury. A marginal pigmentation usually appears in the gums, analogous to the familiar lead line. The stomatitis is usually a fusospirillary infection similar to that of Vincent's angina. It is satisfactorily treated by the methods customarily employed in Vincent's angina and may even be rapidly cured by the local application of the tartrobismuthate in powder form. Bismuth appears in the saliva but in an altered form, probably combined with sulphur, in which it has lost its spirillicidal properties.

The immediate results from the injection of bismuth compounds in syphilis appear from the published reports to be as good as or better than those obtained with mercury and arsenic compounds. In any case, the drug will be valuable for alternate use with the latter, in those cases where the infecting parasite has apparently acquired a degree of tolerance to the drug. It will be several years before the end results from bismuth treatment can be comprehensively tabulated. In fact it has not been until recently that we have come to realize the significance of the late unsatisfactory accidents from standard treatment with mercury and arsphenamine.

The discovery of the treponema pallida by Schaudinn and Hoffmann, the cultivation of the spirocheta by Noguchi, the application of the Bordet-Gengou phenomenon to the serologic diagnosis of syphilis by Wassermann and the preparation of salvarsan by Ehrlich have concentrated our attention on attempts to rid the body of the spirochete and to obtain a serologic cure, and have diverted our thoughts from the patient as an individual, so that in many instances we have lost sight of the importance of clinical cure. This is

often not obtained until long after the Wassermann reaction has become negative.

To summarize the treatment of syphilis in a few words, I would emphasize two general facts which may appear mutually antagonistic. The eradication of syphilis in the individual case is not always indicated by the obtaining of a negative Wassermann reaction. Sometimes, particularly in nervous system involvement, the patient is still actively syphilitic and suffers from a progressive disease even though the blood reaction is negative. In these cases treatment which is discontinued on a negative laboratory report is incomplete. It is the disease and not the laboratory reaction that should be treated.

On the other hand, there is a disposition on the part of many to treat the patient too vigorously in their effort to obtain a serologic cure, so that the general condition suffers from the poisoning of medication. Here it is often better not to attempt to obtain a negative Wassermann reaction. In individuals who are Wassermann fast, the treatment is sometimes more disastrous than the disease. This is often also true in elderly individuals or patients with advanced myocardial degeneration, aortitis, etc.

Here we are faced with a dilemma. Some patients with negative Wassermans are not cured and need more treatment. Others, whose Wassermans are still positive, should receive no further treatment. How may we determine whether to go farther or to stop short? The answer to both phases is summed up in the dictum, treat the patient rather than the disease. The laboratory tests are of inestimable value but of greater value still is attention to the clinical course of the patient's illness.

404 Professional Building.

SOME RESULTS OF PROTEIN SENSITIZATION WORK IN BRONCHIAL ASTHMA, HAY-FEVER AND ALLIED CONDITIONS. REPORT OF CASES.*

By GRAFTON TYLER BROWN, M. D., Washington, D. C.

A year ago I read a paper¹ before this Society, reviewing in a brief way protein sensitization work and reporting my own case. I

*Read before the Medical Society of the District of Columbia, March 21, 1923.

1. Brown, G. T.: Protein Sensitization in Bronchial Asthma, Hay-Fever and Allied Conditions. With Report of Writer's Own Case, Va. Med. Mo., 49:188 (July) 1922.

feel that it might be of interest and possibly of some benefit to relate to you some of my own results.

BRONCHIAL ASTHMA.

By means of a careful history and cutaneous tests, bronchial asthmatics may be roughly classified into the following groups: food, animal epidermal, bacterial, pollen, miscellaneous inhalants (orris root, etc.), and non-sensitive. In the limited time at my disposal it will only be possible for me to report one case as illustrative of each of these groups.

FOOD ASTHMA.

Case 1. Mr. J. T. M. Age 62 years. Referred by Dr. Welburn. Had severe asthma for about twenty years, accompanied by a very productive and troublesome cough. Attacks came on suddenly. Worse in summer. Also had symptoms of hay-fever. Whenever he went in a field where they were cutting wheat or to a mill where they were threshing it, he would be unable to sleep all night because of asthma and hay-fever. He gave large reactions to the proteins of wheat flour and tomatoes, and lesser reactions to the pollens of wheat and rye. I advised him to completely eliminate wheat and tomatoes from his diet and gave him a sputum bottle, feeling that an auto-genous vaccine was indicated because of the severe bronchitis. A week later he brought back the empty sputum bottle and reported that he was entirely free of all asthma, cough and expectoration. He has remained free to date, a period of eight months, with the exception of a few isolated attacks following exposure to wheat, *i. e.*, one attack followed going through a wheat field, another followed repairing a flour sifter. In this case wheat flour undoubtedly acted both by inhalation and ingestion to produce symptoms.

ANIMAL EPIDERMAL ASTHMA.

Case 2. Mr. D. W. L. Age 32 years. Referred by Drs. Hazen and Eichenlaub. Asthma, perennial hay-fever, and eczema. Asthma started at about 9 years of age. Hay-fever and eczema started at about 12 or 13 years of age. Family history negative as regards sensitization. Patient stated that if he went to the theater where they had an animal act with horses, or to a parade where there were horses, or if he rode behind a horse he would have severe asthma and hay-fever. His occupation as foreman of a coal company, with

teams passing in and out of the yard almost continuously, brought him more or less intimately in contact with horses. On his vacations, when he would visit his mother and father in the mountains, where there were no horses, he would be entirely free of asthma, hay-fever and eczema. On his last visit, however, they had gotten a horse, and he had asthma, hay-fever and eczema the entire time he was there. Whenever his asthma and hay-fever were worse, his eczema would also be worse. Patient was so miserable most of the time, that he had contemplated suicide. Has taken about eighteen X-ray treatments for eczema and has had two negative Wassermans. A few tests for protein sensitization were performed in October, 1920, by Dr. Ketron, of Baltimore, who found him very sensitive to horse dander. On thoroughly testing him, I obtained a four plus reaction to horse dander and lesser reactions to a number of other substances. Treatment with horse dander protein extract has completely relieved him of asthma and hay-fever, but has had little effect on the eczema, and elimination of the various other substances to which he reacted apparently had no effect. In spite of a large number of treatments with horse dander protein he still gives quite a marked cutaneous reaction to the same. I believe this incomplete desensitization accounts for the persistence of the eczema.

BACTERIAL ASTHMA.

By bacterial asthma, I mean asthma due to sensitization to protein contained in the bodies of bacteria.

Case 3. Mrs. G. C. Age 33 years. Referred by Dr. Le Comte. Patient had influenza in 1917, which left her with a very severe cough and hemoptysis. Was told by a physician that she had pulmonary tuberculosis and was sent to Asheville, N. C. This diagnosis was unconfirmed by specialists there and she returned home. Then asthma set in, which she has had steadily ever since, a period of about five years, accompanied by a very troublesome bronchial cough. Asthma always worse at night, in fact she had not had a whole night's sleep in five years. Very susceptible to colds, which always aggravated the asthma and were accompanied by ulceration of her throat and enlargement of the cervical lymph glands. Treated by competent nose and throat specialists the latter part of 1919. X-ray of teeth,

negative. Took osteopathic treatments from February, 1920, until October, 1921. About March 1, 1922, she developed what appeared to be angioneurotic edema, affecting her ankles, hands, lips and eyelids. Her skin had become very rough, split around finger nails, and cracked and bleeding between toes. Urine negative. Blood and spinal fluid Wassermann negative. On testing her I obtained a very marked reaction to the protein of streptococcus hemolyticus, and lesser, though quite definite, reactions to wheat flour, tomatoes, peas, turkey and a few other foods. An interesting feature of her food reactions was that they were all delayed, *i. e.*, did not appear until several hours after the tests were made (food reactions almost always appear within five to thirty minutes). Her reaction to streptococcus hemolyticus did not appear until the next day and was of the inflammatory type with no wheal formation, but I have found this to be the rule with bacterial reactions. She was advised to completely eliminate from her diet all foods to which she had reacted. Examination of two separate specimens of her sputum showed it to contain a weakly hemolytic streptococcus in practically pure culture, from which a vaccine was prepared, and she was treated with the same. Under this treatment her asthma cleared up very promptly and she remained entirely free for a period of four months. The edematous swellings disappeared following the second or third treatment. Her skin resumed its normal texture, with a disappearance of the splits and cracks about the fingers and toes. Then she went in swimming one day, got her hair soaking wet, and rode around in an open machine. As a result she had an acute attack of pleurisy and congestion of the lungs, followed by a return of her asthma, though in a much milder form. I retested her with bacterial proteins and she gave only a doubtful reaction to streptococcus hemolyticus, but quite a marked reaction to staphylococcus aureus.

Examination of her sputum at this time revealed staphylococcus aureus and streptococcus hemolyticus in the proportion of about 4 to 1, and a vaccine was prepared containing these organisms in the same proportion. Since the first treatment with this vaccine she has been free of asthma, with the exception of a few isolated attacks following the ingestion of some offending food, such as wheat flour or

tomatoes. Has gained about 23 pounds and, other than being a little wheezy, at times, when she has a cold, looks and feels wonderfully well. On a very recent test she gave only a slight reaction to staphylococcus aureus, and streptococcus hemolyticus was absolutely negative.

POLLEN ASTHMA.

Seasonal pollen asthma, especially as an accompaniment of seasonal hay-fever, is so commonly met with that I will report instead under this head a case of non-seasonal pollen asthma.

Case 4. Mr. E. S. Age 30 years. Referred by Dr. Cissel of Highland, Md. Asthma. First attack started in fall about three years ago and lasted until the following March. Was living in White Plains, N. Y., at the time. Second severe attack started in March, 1922, left him some time in April, then returned the latter part of May or first of June and had been very bad ever since up to September 1922, when I started to treat him. Spent two weeks in hospital because of asthma. In between these very severe attacks he would be wheezy. Asthma worse at night. No difference between warm and cold, or dry and damp weather. During severe attacks took from 10 to 15 minims of adrenalin chloride hypodermically every three hours. This nearly always relieved him, but only for about three hours. No relief from inhalation of fumes from asthma powders. No symptoms of hay-fever, *i. e.*, no itching of eyes and only an occasional sneeze. Very susceptible to colds, which aggravated asthma, in fact seemed to have a cold nearly all the time. Wheezed a good deal and was scarcely able to move during bad attacks. Weight 117 pounds. On testing, found him sensitive to sweet vernal grass, red top, orchard grass, chicken feathers, cat and dog hair. Had cats and dogs about the house at this time, but was not exposed to cats or dogs when he had his first severe attack in White Plains, N. Y. Floss pillows were substituted for feather ones, and we felt that some improvement followed this change. Treatment was started September 28, 1922, with the three grass pollens to which he had reacted and his asthma cleared up almost immediately, and he has remained free ever since, with the exception of being a little wheezy when he has a cold. Is now doing the hardest kind of work with no shortness of breath on exertion, and

states that he feels better than he has for over 3 years. Present weight 142 pounds, a gain of 25 pounds.

Comment: I know there are a number who will deny that grasses, ragweed, etc., can cause asthma at other times than during their period of pollination, but the fact remains that I have seen a number of these non-seasonal cases who give definite reactions to pollens, and treatment with the pollen or pollens involved relieves them of asthma; again, too large a treatment aggravates the asthma. A possible explanation of this would be that there is sufficient pollen lying around in dust to cause symptoms on inhalation at any time of year. However, it would seem that if this were so, the seasonal hay-fever sufferer, who is often exquisitely sensitive to pollen, should also have symptoms at other times of the year. What seems to me to be a more probable explanation for these non-seasonal pollen asthma cases is that they are so poisoned during pollen season that their resistance is lowered for the remainder of the year; possibly during pollen season a disturbance of the colloidal balance of the blood occurs, which persists more or less throughout the year, unless corrected by specific pollen therapy.

ASTHMA DUE TO MISCELLANEOUS INHALANTS.

Under the head of miscellaneous inhalants, orris root easily stands first, because of its extensive use in face powders, sachets, tooth powders and hair shampoos.

Case 5. Miss E. H. Age 35 years. Perennial hay-fever and asthma of eight years' duration. Itching and redness of eyes, for which she used boric acid and argyrol. I might state that itching of the eyes is very significant of sensitization. Had never had a very severe attack without what appeared to be a cold, but was wheezy practically all of the time. Had noticed that face powder caused sneezing. Skin tests were made, and she gave a larger reaction to orris root than I have ever seen to any test. The flexor surface of her forearm was red, hot and swollen, extending nearly from the wrist to the elbow. She also gave a positive reaction to her own face powder. On substituting a powder which did not contain orris root all of her symptoms cleared up almost immediately. Had some slight trouble later, which she found to be due to a powder used by her room-mate. This was ten months ago, and she has had no recurrence.

NON-SENSITIVE ASTHMA.

Under non-sensitive asthma, are grouped all those patients who fail to react to any form of protein. It is my opinion that a considerable proportion of these so-called non-sensitive cases are also due to sensitization, and that we have merely failed to detect the offending substance. In justification, however, of the assumption that we have made a diagnosis by elimination, in these patients, of bacteria as the cause of their trouble, I might say that the majority of them can be relieved of asthma by proper autogenous vaccine therapy.

Case 6. Mrs. M. O. H. Age 43 years. First seen August 1, 1922. Severe asthma and bronchitis. Bronchial trouble started September, 1921, followed in February, 1922, by violent asthma. Believes she had several mild attacks of asthma preceding this date, unrecognized by her physician. Had never been susceptible to colds, and never troubled with a cough previous to September, 1921. Worse in cold weather, and on damp days. Sudden changes in temperature aggravated her trouble. Worse at night. During bad attacks could hear her wheeze all over house. Coughing preceded asthmatic attacks. Cough was very productive and sputum blood streaked at times. No itching of eyes. Her history, therefore, pointed very strongly towards germs as the cause of her asthma. On testing, found her negative to all proteins. An autogenous vaccine was prepared from her sputum containing streptococcus hemolyticus and viridans in the proportion of about 4 to 1, and she was given 100 million organisms as the first dose. Prostration set in shortly after this treatment, followed by a marked improvement in the asthma and bronchitis. I repeated the same dose, following which she was free of all symptoms of asthma and bronchitis. I then gave her 200 million, which dose was followed by petechiae on limbs, but no asthma or cough. This dose was repeated, with no reaction other than temporary prostration. Then 300 million was tried, and resulted in an extreme aggravation of her asthma and bronchitis. I saw her three times in one day and was forced to resort to hypodermics of adrenalin, morphine and atropine, and heroin for relief. Her family became alarmed at her condition and Dr. Sterling Ruffin was called in consultation. Because of her unpleasant reactions to vaccine treatment, a von Pirquet test was performed,

which gave a positive twenty-four hour reaction. She told me at this time that quinine had always disagreed with her. A skin test with quinine sulphate gave a positive reaction, demonstrating the fact that sensitization may exist to non-protein substances. It was discovered that she had been taking a tonic containing quinine, which was of course discontinued. A couple of very small tuberculin treatments were then tried but with absolutely no effect on the asthma. In this connection, I might state that I have been unable to get the favorable results reported by Van Leeuwen and Varekamp in the tuberculin treatment of asthmatics giving a positive von Pirquet. Then treatment with the autogenous vaccine was tried again, starting with a smaller dose, *i. e.*, 50 million, and increasing it more cautiously than before. Ten treatments were given, the maximum being 300 million. Following the first of these treatments her cough and asthma disappeared and she has had no further trouble.

Have reported this case in considerable detail to meet the objection so frequently raised, that results in the vaccine treatment of asthma are always due to non-specific protein therapy. If this were true, it would seem that large doses would be more effective than small ones, but I have repeatedly found the reverse to be the case.

HAY-FEVER.

Hay-fever may be perennial or seasonal in type. Perennial hay-fever has already been mentioned (cases 2 and 5). Seasonal hay-fever may be classified into early spring, late spring or summer, and fall types.

EARLY SPRING HAY-FEVER.

Early spring hay-fever is not very commonly met with, and is usually due to sensitization to tree pollens.

Case 7. Mrs. J. M. B. Age 48 years. Referred by Dr. Louis Greene. Early and late spring or summer hay-fever for past three years. Has been susceptible to roses all her life. Attacks started the last of April or first of May, reached their height about the middle of May, became milder in June and were usually over by July 4th. Attacks began with sneezing, which lasted one-half to three-quarters of an hour, then eyes would itch and water. Nose would stop up at night and she would wake in morning with headache and

sense of fullness in head. Eyes bothered her more than anything else, for which she had been taking local treatment. I first saw her May 18, 1922, at the height of her attack. On testing her I obtained a very marked reaction to hickory tree pollen and also quite a large reaction to rose pollen. Tests with grass pollens were all negative. She stated that she had a number of hickory trees on the place, one of which was right outside her bedroom window; and also that she spent considerable time in her rose garden. She was advised to sleep on the opposite side of the house away from the hickory tree and to stay out of the rose garden. I had a report a week later that she had no further trouble.

Roses are insect pollinated and do not cause symptoms except on intimate exposure even in sensitive patients.

LATE SPRING OR SUMMER HAY-FEVER.

Late spring or summer hay-fever is commonly spoken of as "rose cold," which is a misnomer, as most of these cases are due to sensitization to one or more of the grass pollens.

Case 8. Mrs. D. B. H. Age 29 years. Referred by Dr. Arthur Zinkhan. Had hay-fever almost as long as she could remember. Affected in April, May, June and first part of July. She reacted to all the grass pollens, her dominant reaction being to timothy. Believing that sufficient treatment with timothy alone would desensitize her against the entire grass group, she was given pre-seasonal treatment with timothy pollen extract. As a result, she went through the entire season without the slightest symptom of hay-fever.

Pre-seasonal treatment, started far enough in advance of season to get the patient as completely desensitized as possible just before pollination of the particular offending plant or plants, is undoubtedly the ideal method of treating seasonal hay-fever. In those cases in which preseasonal treatment is incomplete, or in which there has been no pre-seasonal treatment, co-seasonal treatment is well worthy of trial, as illustrated by the following case.

Case 9. Mr. M. L. Age 34 years. Late spring or summer hay-fever for past six years. Attacks started about May 10th, and lasted until middle of July. Perfectly well all the remainder of year. First seen May 12, 1922. His hay-fever had started the day before, and

appeared to be a very severe attack. He reacted to all the grass pollens, his dominant reaction being to timothy. Rose was absolutely negative. Co-seasonal treatment with timothy pollen extract was started May 13th. After one week, during which three treatments were given, there was a marked improvement, and after three weeks' treatment his hay-fever disappeared and he remained entirely free for the remainder of the season.

Pre-seasonal treatment is given at weekly intervals unless the time is limited, in which case the interval between treatments may be lessened, especially on the smaller doses. Co-seasonal treatment, on the other hand, is preferably given at irregular intervals, depending upon the duration of relief following the individual treatment.

FALL HAY-FEVER.

The typical fall hay-fever season is from about the middle of August until the first frost, which coincides with the period of pollination of ragweed, to which pollen practically all of these cases are dominantly sensitive.

Case 10. Mrs. J. V. Age 32 years. Fall hay-fever and asthma since 4 months of age. Attacks started between 15th and 20th of August and lasted until first frost. Free remainder of year. Asthma, which fortunately only occurred during hay-fever season, was so severe that she was unable to move, and was kept under morphine with a trained nurse in attendance. Had spent previous five seasons in Michigan and was practically, though not entirely, free there. Tonsillectomy, removal of nasal polypi, and cauterization of nasal mucous membrane had been tried, but with no relief. Had sinus trouble for past two winters. Patient stated that contact with daisies would cause hay-fever and peaches on the table made her feel uncomfortable. Cantaloupe or watermelon caused itching of throat. Unable to eat grapefruit as it caused severe urticaria. She reacted to short ragweed, giant ragweed, daisy and a few other members of the compositae; also to grapefruit, cantaloupe, watermelon and peaches. Her dominant reaction being to short ragweed, this was selected for pre-seasonal treatment. As a result of this treatment, which she put to a very severe test by driving around the country in an automobile, she went through the entire season, for the first time in her life, without a sneeze or a wheeze. She had one

day of slight prostration during season following the eating of peaches. This illustrates the advisability of making tests in these seasonal hay-fever patients with other than pollens, which are of course necessary, in order to detect any possible contributing factors.

What has been said under late spring or summer hay-fever in regard to pre-seasonal and co-seasonal treatment applies also to fall hay-fever.

Case 11. Mr. E. G. M. Age 39 years. Referred by Dr. Horrigan. Fall hay-fever of about five years' duration. Attacks started about August 20th, and lasted until frost. Well all the rest of year. I first saw him September 7, 1922, in the midst of his hay-fever, and a pitiful sight he was. His eyes were very much inflamed and itched intensely. There was profuse lachrimation; also sneezing and rhinorrhea. Some nights unable to sleep at all. Worse on dry days.

This attack had started August 17th, a little earlier than usual. He reacted to a number of fall pollens. His dominant reaction being to short ragweed, this was selected for co-seasonal treatment. The first treatment was given September 8th, and as a result he reported five days later that he was 90 per cent relieved. Two more treatments were given with equally gratifying results.

ECZEMA.

Eczema due to sensitization to one or more food proteins is very commonly met with, especially in infants and young children. Eczema or dermatitis, however, may also be due to contact of a sensitized skin with most any type of substance.

Case 12. J. J. R. Male. Age 47 years. Referred by Dr. H. H. Hazen. Eczema of thirteen weeks' duration. Started on front of neck. Patient thought it was due to shaving too close. Then spread to forehead and around mouth. Next it spread to arms, then legs, and finally body affected, especially around waist and back of shoulders. Had grown progressively worse in spite of various local applications, and X-ray treatments. Itching severe at times. Neck raw and bleeding. Legs swollen. Considerable pus formation. Food tests all negative. Tests were performed with great difficulty because of the condition of his skin. He had been wearing a long fur coat ever since the beginning of the skin trouble,

so crude alcoholic extracts were prepared from fur clipped from the collar and lining of this coat, to which he reacted. On discarding the fur coat his skin cleared up.

Unfortunately he has since developed an erythema, which we feel is quite different from his former trouble. I might say that this erythema is clearing up very nicely following one X-ray treatment.

In closing, I would state that in reporting these cases selected from many other similar ones to illustrate some of the important phases of protein sensitization work, it is not meant to infer that all of the results are as satisfactory as these.

1726 M Street, Northwest.

FEVER.*

By WYNDHAM B. BLANTON, M. D., Richmond, Virginia.

There remain enough puzzling questions concerning temperature in health and disease, I believe, to make it still a subject of interest to us all. For instance, there is a well recognized diurnal fluctuation of temperature in man, which averages about one degree and is maximum in the afternoon. Nocturnal birds exhibit a similar fluctuation, but on the contrary their maximum rise is in the early morning. Why is it then that if man reverses his habits and works at night, he continues to have his maximum rise in the afternoon even though he be asleep? And what after all is the cause of the afternoon rise of temperature?

Heat Production and Heat Loss: The satisfactory understanding of fever or pyrexia implies the proper evaluation of the balance between these two factors. The creation of heat in the body arises chiefly from oxidation processes going on in the muscles, though other subsidiary oxidations add slightly to the heat produced. These oxidations include chemical changes in the glands during function, and the specific dynamic action of protein and carbohydrate digestion. In health, need for increased heat production is responded to by additional muscle work, such as shivering, increased muscle tone, or voluntary exercise.

In, disease, increased heat production or fever is explained by Macleod¹ as the resultant of the effect of toxins on tissue increasing the osmotic pressure of their protoplasm. In consequence there is a flow of fluid from blood vessels to tissue followed by concentration of

*Read before Richmond Academy of Medicine and Surgery, April 24th, 1923.

the blood. (Such concentration can easily be demonstrated in fevers). Now with concentration of the blood there naturally follows a reduction of the blood upon the surface of the body. Contraction of surface vessels is the expected reaction to diminished blood flow or concentration. The conditions of a cold skin therefore obtain. The normal afferent impulses from an area of contracted vessels, or a cold skin, stimulate the heat center, which may in turn respond in one of two ways, either by increasing heat production or by diminishing heat loss. In either event a rise of the average body temperature is the result. Two other less inviting theories of heat production in fever find their adherents. One is the so-called neurogenic theory, which implies the integrity of nervous connections to and from the essential heat center; the other places the responsibility of febrile acceleration entirely on the liver and is based on comparative measurements of heat in the liver and muscles during pyrexia. In any explanation of heat production in the body, it seems to me highly improbable that there should be a different mechanism in health and disease. The heat of pyrexia must be produced in general as the normal body heat is, that is, in muscle oxidation. The stimulus may arise centrally, as in heat center punctures, or locally, as when increased heat production follows infections in cold blooded animals, or in warm blooded animals with high severed cords.

On the whole, heat loss is better understood than heat production. The elimination of heat in the body follows the well known laws of conduction, radiation and evaporation. The first two factors account for three times the loss due to evaporation. On the surface of the body almost the entire elimination of heat occurs. The cutaneous circulation under vasomotor control is a most important link in the mechanism for heat loss, as in this way the surface mobilization of heat bearing blood is effected, and it is at the surface of course that cooling occurs. The mechanism which controls this loss of heat is probably dependent upon the so-called heat center of the corpus striatum, which, in response to various afferent stimuli, increases heat elimination by the stimulation of sweat glands and vasodilators, and decreases heat elimination by the stimulation of vasoconstrictors. Thus the cutaneous circulation of an extremity may be doubled by

applying heat. The normal and natural stimulant, aside from afferent cutaneous impulses registering surface temperature is increased body temperature, as for example during exercise or in the pyrexia of disease. It has been shown that the simple flowing of the pyrexial blood through the cerebral circulation is sufficient to stimulate the heat center.

When all the factors are considered, heat storage seems to be the essential element of pyrexia. In other words the thermo-regulator has been turned up a notch or two. This is effected chiefly through conservation of heat. It is remarkable how little additional heat is produced in pyrexia, (20%), as compared to that formed during eating or exercise, (300%).

The Calorimeter has played an important role in the elucidation of the factors entering into the mechanism of heat production and heat elimination in the rise and fall of temperature. The most elaborate studies concerning this phase of fever have been carried on under the direction of Dr. DuBois, using the Russell Sage respiratory calorimeter. Typhoid fever, malaria, and tuberculosis have been the febrile diseases chiefly investigated. In all of them it has been shown that normal respiratory quotients obtain. It has likewise been shown that heat production during the febrile period is relatively small, being increased but forty per cent in typhoid and thirty per cent in tuberculosis. In the malarial chill the increase is from one hundred to two hundred per cent, due probably to shivering, with the accompanying muscular contractions. The exact mechanism has been most elaborately worked out during the several phases of this chill². Here it has been shown that the skin temperature lags strikingly behind the rectal temperature until a considerable while after the chill. It has also been shown that heat production is but slightly increased prior to the chill. During the chill there is a marked increase. Subsequent to the chill, for a few minutes the increase continues to range between twenty and thirty-eight per cent. It then slowly decreases to normal. Heat loss remains normal throughout the period of the chill, is slightly increased immediately afterwards, but rises sharply during the period of the continuous high temperature and increases still further during the falling temperature. In typhoid fever, "a rising temperature was accompanied by an increasing heat production

which outweighed the increasing heat elimination. With a falling temperature the heat production remained fairly level while the elimination was increased."³ In tuberculosis a rising temperature was characterized by increased heat production, a falling temperature by increased heat loss. The toxic destruction of protein with a negative nitrogen balance in typhoid fever may be counteracted by feeding fifty to one hundred per cent more than the normal protein requirement. In the case of tuberculosis this toxic destruction of protein has been shown to be smaller than in typhoid and the habit of overfeeding, especially of protein, has been remarked upon as possibly dangerous in that the accompanying elevation of metabolism throws more work upon pulmonary function.

Clinical Thermometry: Astonishing is the regularity with which physicians employ thermometers and the ubiquitousness of the hospital temperature chart argues for widespread faith in such data. The use of any exact instrument, such as the mercury thermometer, often leads us astray into believing that we thereby gain exact information. And so we lay great stress upon temperature variations, reading and charting tenths of degrees. As a matter of fact clinical thermometry as ordinarily practiced, be the thermometer ever so exact, is often very misleading. This is simply because we assume that the thermometer reading represents the body temperature when as a matter of fact it registers only local temperature. The temperature of the mouth is different from the temperature of the axilla and the temperature of the rectum, and no one of these represents the temperature of the body. In estimating the heating efficiency of a house furnace, to test only the temperature of one room affords no information at all concerning the other rooms. Now not only does the temperature of the mouth, axilla and rectum vary under normal conditions, but the temperature of the mouth itself varies in health in response to a number of factors. The circulation and vasomotor control are extremely important in determining these local variations, which as we have said, in no way affect the temperature elsewhere in the body. Cold hands and cold feet may accompany a rising temperature. Heat elimination may be the same over a warm skin as over a cold skin, depending entirely upon the level of blood

cooling. If there is vasomotor dilatation and surface cooling there is warmth of the skin. If the blood is cooled in the deeper layers of the skin, the skin is cool.

Strictly speaking we are seeking for the average body temperature in practicing clinical thermometry. As a matter of fact what we obtain is only local body temperature. The average body temperature represents a calculation based upon the height and weight of the individual and the difference between heat production and heat loss over a definite length of time. This is of course too difficult a procedure for routine use and is unnecessary except in careful investigations. As a usual thing the clinical thermometer affords useful and approximate information. It does not give us average body temperature, and if the factors of local variation are carefully considered and eliminated, mouth temperature, for example, should in general parallel, though not exactly equal, the average body temperature. I do not wish to disparage the use of the clinical thermometer, but to emphasize care and conservatism in the interpretation of slight temperature variations from the normal.

Fever in Diagnosis: Armed with all the available knowledge concerning the physiology and pathology of pyrexia, we are often at a loss in the interpretation of temperature elevations. We may actually fail to recognize the presence of pyrexia, as for example when a patient is repeatedly examined in the morning and shows a temperature rise only in the afternoon; or when a subject of intermittent temperature is seen on the afebrile days. Or on the other hand, we may be puzzled by elevated temperature in the apparently healthy, discovered in examinations for military service or insurance. This type of temperature rise is familiar to hospitals under the name of "Sunday temperature." It is probably purely a nervous phenomenon exhibited by patients entering a hospital, coming to a doctor's office, or seeing visitors. In the nervously unstable one occasionally encounters temperatures of 100° to 102° accompanied by corresponding accelerations of the pulse. That these rises are nervous in origin is evident from the fact that if such persons are made to recline from ten to fifteen minutes in a quiet room the temperature quickly returns to normal with the slowing of the pulse. So common in this elevation of temperature in nervous young women

observed to follow the excitement of physical examination that the practice should be followed of securing all constitutional signs before the history or examination is undertaken. The physiological explanation of these cases probably lies in the instability of a center which allows of vasomotor constriction with diminished heat loss. There must then arise afferent stimuli from a cold skin accelerating heat production. The effect of psychic influences in these persons is obvious also from their cold clammy skin.

Martinet,⁴ for clinical consideration, divides pyrexias into those of short and long duration, and the intermittent fevers. The real cause of the majority of fevers of short duration is probably never discovered, even taking into consideration the exanthemata, respiratory and gastro-intestinal infections. In children, for example, the two or three day temperature flare-ups accompanied by no very definite concomitant findings, with all due respect to the pediatrician, make his diagnosis little better than guess work. Probably in the summer time he brands most of his cases gastro-intestinal and in the winter respiratory, but the febrile child in summer will often tax the imagination to find anything wrong with his stools, and the febrile child in winter may have neither red throat nor cough. Similarly with adults. An honest analysis of our short febrile cases will show us at best to be flounders in the dark, willing to catch at any straw. Thus every winter temperature of short duration practically becomes a case of that awful disease known to the public as "Flu." I do not think there is any doubt of the fact that we know little of the causation of many of the short lived pyrexias, by whatever name we choose to brand them, and fortunately, the storm has come and gone while we are still choosing among our brands.

When we approach the fevers of long duration there should be and probably is more accuracy in diagnosis, because we have more time to make observations, and the chances of more striking physical findings are greater. Cabot⁵ from hospital statistics states that typhoid fever, sepsis and tuberculosis embrace 90 per cent of long continued fevers. Martinet⁴ puts tuberculosis at the head of the list, emphasizing the importance of latent tubercle infection of the lungs and kidneys, and maintaining that ninety-eight per cent of long continued

fevers fall into a category headed by tuberculosis and including sepsis, (that is, endocarditis and pus anywhere, obvious or occult, such as the appendix, gall bladder, genito-urinary, gastro-intestinal tracts, pleura, lungs or lymph glands,) influenza, rheumatism, typhoid and paratyphoid infections. The remaining two per cent include occasional causes such as meningitis, malaria, leukemia, neoplasms, Hodgkin's disease, atropine poisoning, and thyrotoxicosis.

I believe that the average case of obscure pyrexia of long standing will be elucidated by following the usual leads of a careful history and the physical findings, but this is not always the case, and the advantage of having in mind such a classification as that of Martinet⁴ is frequently illustrated, as for example in a case of carcinoma of the stomach. The patient, a middle aged man, presented himself with an afternoon temperature of 100 to 101 degrees, complaining of weakness, and with the associated findings of leucocytosis, and anemia, and the signs of myocardial disease. Attention was focused on his temperature, the cause of which baffled investigation for more than two months. Then the search was enlarged to include all possible causes of pyrexia. There were no leads pointing to the stomach until the sudden onset of vomiting. Gastric analysis, stool analysis, and X-ray of the stomach were now done, and immediately established the diagnosis of carcinoma of the stomach. On the other hand, a well nourished woman of thirty-three complained of headache and fleeting pains throughout the body. She had a moderate leucocytosis. Her temperature ranged however from 103 to 100 degrees for more than two months without revealing a satisfactory cause. The history, physical and laboratory findings, including urine, blood, Widal, stool and X-ray of head and chest, were disappointingly negative. The usual string of specialists explored their respective fields. An exploratory laparotomy was likewise barren of results, and the elevated temperature continued. She returned home, dismissed her doctors and in a few weeks was temperature free. Nor did she nor anyone else know how it happened.

The Purposefulness of Pyrexia: Both experimental and clinical experience point I believe to the usefulness of pyrexia especially in infections. Pyrexia itself, except in heat stroke, where there is probably some other ad-

ditional factor operative, is rarely injurious to the individual. Naunyn, as pointed out by Ringer⁶, demonstrated that animals could be maintained for long periods of time at febrile temperatures without showing any injurious effects. Rolly and Meltzer⁷ years ago showed the actual beneficial effect of hyperthermia upon animals in resisting infections. Animals which were kept at a temperature of about 40 degrees Centigrade, when injected with cultures of pyogenic organisms, showed a fifty per cent mortality, whereas all control animals, whose temperature was not raised, uniformly died after similar injections. It seems fairly certain that fever serves the useful function of assisting in the body's reaction to infection. In spite of the fact that bacteria in the test tube show fairly definite optimum temperatures for growth, in the body the temperature never rises sufficiently to inhibit seriously their growth *per se*. The effect of pyrexia seems to be entirely in favor of raising immunity. Ringer cites a table showing the very definite effect of elevations of temperature upon the phagocytic function of the leucocytes. Rolly and Meltzer also showed that bacteriolytic substances as well as agglutinins were elaborated in far greater quantities and much more rapidly in pyrexial animals than in controls. In this connection MacCallum⁸ says that fever is in a way analogous to the vascular reaction in inflammation in that it is the process which facilitates the more essential activities of the phagocytes and the production of defensive chemical substances in the body.

The Treatment of Pyrexia: The proof seems fairly certain that pyrexia is purposeful, that the processes of resistance to infection go on more vigorously and effectively in the human body in the presence of an elevation of its temperature. In view of the fact that during exercise heat production may exceed by ten times the heat production of fever, which probably averages about twenty-five per cent plus, there is little harm to be expected from the actual excessive heat production. Heat storage, however, due to failure in heat elimination, may or may not be injurious. Meara⁹ believes that temperatures that do not exceed 104 degrees do not need treatment *per se*. Hyperpyrexia which may be taken to represent temperatures above this figure demand the usual treatment exemplified in the cold bath for sunstroke. Meara⁹ goes on to point

out that hydrotherapy in febrile conditions, such as typhoid fever, is not directed primarily at hyperthermia, but is useful for its influence in increasing elimination through the skin and for its reflex influence upon blood pressure and its steadying effect upon the heart and respiratory centers. On the same score the use of drugs, particularly the coal tar products, should be condemned. Whether they reduce temperature by increasing heat loss (as the coal tars), or by sweating (as aconite), or by vasodilation (as whiskey), or by lessening heat production (as quinine), we are in the end interfering with a purposeful reaction and our therapy is meddling.

The protein shock gotten by intravenous injection of dead bacteria, advocated by Snyder¹⁰ and others in the treatment of chronic arthritis, is thought to depend for its effect upon the chill and accompanying high fever.

The hyperpyrexia of thermic fever or heat stroke is no doubt injurious. Temperatures of 104° to 114° accompanied by coma and convulsions are certainly associated with cerebral and visceral injury.¹¹ This is borne out at autopsy in such findings as cerebral edema and hemorrhage with cloudy swelling of the liver, heart and kidneys. The fact that it appears that the fatal cases show high urea and creatinin retention in the blood bespeaks some other antecedent factor in those who die, especially when the age incidence and alcoholic history are taken into consideration.¹²

Aside from hyperpyrexia there appear to be two possible sources of harm from elevations of body temperature. The negative nitrogen balance which often accompanies pyrexia is taken to indicate a specific destruction of protein. Sufficient feeding, especially of carbohydrates, as has been shown, will spare the body protein. Acidosis may also follow fever, due likewise to deficient carbohydrate intake and the consequent hurried and incomplete combustion of fat. Sufficient allowance of starches and sugars in the diet will ward off this complication. That leaders in the profession have appreciated the dietetic demands of pyrexia is shown in the request of Robert Graves nearly a century ago that his tombstone bear only the inscription, "He Fed Fevers."

300 West Grace Street.

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A DISCUSSION OF SOME PHASES OF MENTAL DISEASES.*

By JESSE A. STRICKLAND, M. D., Norfolk, Va.

In discussing the subject of mental disturbances, I realize that I have nothing new to bring forth. My object is simply to freshen your memory with some phases of the general subject, and try to show that because an individual is insane, it does not necessarily follow that he should be given over to the care of an attendant, and lost sight of by the medical man. The insane are no longer looked upon as the inspired instruments of the Deity. Insanity implies disease, either of the whole organism or of some special part. There are usually no demonstrable changes in the brain or its appendages and the mental symptoms may be due to exhaustion from some visceral disease, or from poisons circulating in the blood stream. That the brain can be influenced by poisons without any microscopic changes is definitely proven by the action of certain drugs, such as alcohol, hyoscine preparations, patent medicines, paraldehyde, and so on.

In this connection it is well to recall that alcohol depresses the motor activity of the brain and, in the acute stages of alcoholism, sets up an ataxia, or may produce a complete toxemia, which manifests itself in delirium, tremors, hallucinations and delusions, both auditory and visual. Pathological studies have shown that prolonged use of alcohol may

result in degenerative changes in the cortical cells, bringing about a mental state known as alcoholic dementia. Of the other drugs that play a part in mental upsets, hyoscine is depressive, causing delirium and disturbance of all the coordinated movements, delusions and hallucinatory experiences; patent medicines act usually by absorption of poison; while paraldehyde results in a temporary upset.

From the mental disturbances which can be traced from such obvious causes, we come to the limitless line of investigation that bears in its train the manifold phenomena that produce the psychoneuroses. In following it, we often touch upon the field of the unknown.

Just how far actual foci of infection enter into the etiology of the psychoneuroses, we are not able to say, but I am of the opinion that a focus of infection in one whose nervous system is already unstable may play a major part in their development. While searching for such a cause, we should not omit a careful examination of the prostate, as this organ may frequently be the seat of a specific or non-specific infection. I recently saw a case of psychoneurosis in a man with infected tonsils, who showed some improvement following tonsillectomy, but whose condition did not finally clear up until a urologist discovered and treated a chronically infected prostate. I might say here that proctitis, or an ulcerated rectum, although rare, may be a source of infection, causing rheumatism and also a mental or nervous state as mentioned above.

Of the infectious diseases, epidemic influenza is probably most prone to be complicated by psychic disturbances. The mental upsets are more frequently seen in persons over twenty years of age, affecting women more often than men. There seems to be a neuropathic or psychopathic predisposition in all forms of psychosis encountered here; most frequently noted in those cases where the psychosis did not become apparent until after the febrile stage of the disease. As a rule, the more serious the influenza, the more severe the psychosis. It is generally agreed that there is no specific influenza psychosis but an unstable mentality may be aggravated by the disease. Menninger¹ has said that the significance of the influenzal psychoses is in their relationship to dementia praecox. Post-febrile delirium and dementia praecox were by far the most numerous sequelae of influenza.

In like manner we find that we do not

*Read before the Seaboard Medical Association, at Newbern, N. C., December 7, 1922.

definitely know just what the pathology of the brain in pellagra has to do with the mental state, which is evidenced by hallucinations and delusions. Here there is very probably permanent destruction of the brain cells. Many patients apparently recover from the initial attack, only to have a recurrence the following year, but some, after one attack, recover completely and never have another.

Advancing from the field of mental disturbances coincident with non-specific infection, we reach those conditions which may be termed functional diseases of the brain, such as epilepsy, dementia praecox and manic depressive psychosis.

The mental condition of an epileptic depends upon the type of continual attacks of the disease, whether petit mal, or grand mal. In many cases of attacks of petit mal occurring in children, the patients have been of low mentality previous to the attacks or even from birth. Just recently I saw a child nine years old, who demonstrated the disease by three or four sharp snaps or jerks of the head. This child did not progress in school, even in the simplest forms of kindergarten work. The Binet-Simon test showed her to be an imbecile. X-ray findings demonstrated a pathological sella turcica. Adults with epilepsy are suspicious, irritable and forgetful, repeating their acts without reason, and forgetting to perform the daily task set for them. Just how much degeneration we have of the cortical cells, or what brings it about, we cannot say. We do know that the attack causes a swelling of the brain tissue and an increase of fluid in the ventricles. I have a young woman under my care who was very bright as a girl, and whether a head injury following a fall from her horse was the cause of her initial convulsion, or whether she had a convulsion and fell from her horse in consequence, I cannot say. I do believe, however, that in many cases the attack is the cause of the accident, rather than the accident being the cause of the disease.

Manic depressive psychosis, as its name implies, consists of two separate conditions: an acute maniacal stage and a depressed phase. According to Kreplin's classification, manic depressive psychosis includes mania, melancholia, circular insanity, and recurrent insanity. There is another type which has been described, in which the patients are mildly depressed. I refer to cyclothymia. These are the cases that are first seen by the general

practitioner, and many are handled very successfully by him. I am convinced that in some way the glands of internal secretion are associated with many types of manic depressive psychosis. Tucker, several years ago, reported a number of cases of pituitary psychosis, which did not differ materially from the manic depressive form. A thyrotoxicosis, or hyperthyroidism, may in like manner be the cause of definite maniacal or depressive attacks. A manic depressive tendency can often be traced from youth in members of psychopathic families. The young man or woman who frequently has the blues over trivial situations, and who is just as easily elevated, is a potential case of manic depressive psychosis.

I have a case of a young woman, twenty-six years of age, a tailoress by trade, who in 1918, after periods of severe headache, for which she sometimes took as many as 20-30 grains of aspirin a day, became very much concerned about a friend who was on the Cyclops, the collier that was lost at sea. His fate preyed on her mind to such an extent that she resorted to the Ouija board for help. Her translations from the board proving unsatisfactory, she passed from this state into that of a raving maniac, talking to the Kaiser, blaming him for the destruction of the ship and the loss of her friend, and claiming that the Kaiser held him in captivity in Germany. Her emotions were demonstrated by violent temper, cursing, and various forms of auditory hallucinations, such as conversing with the Deity and He with her, in regard to the boy's release. This condition persisted for days, the girl being kept quiet only by sedatives, hot packs and the continuous bath. After a period of a few weeks she cleared up well enough to leave the institution, and has had no apparent trouble since; although in talking to her, one notices that she is somewhat elevated.

In contrast to this case, is the following: Mrs. B., age 42, supposedly at the climacteric period, the wife of a coast guard, saw a ship explode and burn near shore, and feared for the safety of her husband, who among others, went to the rescue of the crew. She became greatly depressed after this experience. The depression increased, she became suicidal, and finally refused to take food, which necessitated tube feeding. Her mental and physical inertia was so marked, and her resistance so lowered,

that she developed pneumonia and died within a few weeks after the time of her upset.

In speaking of mental diseases that may be traced from childhood, one naturally thinks first of dementia praecox, since, as its name implies, it is a dementia of the young, occurring about the adolescent period, relatively earlier in girls than in boys. I am not going into its various classifications, except to say that the catatonic type, in my experience, seems more apt to clear up. That is to say, it seems to pass from an acute to a chronic stage. There are cases, however, where a boy or girl has seemed to be bright or even precocious up to the age of puberty, and then, like lightning from a clear sky, develops a sudden upset which we diagnose as dementia praecox. What causes dementia praecox, we are unable to say. Mott,² in his investigations, claims that in a large proportion of dementia praecox, there is complete arrest of spermatogenesis and a more or less regressive atrophy is shown, the degree of changes depending upon the age at which the mental symptoms were first manifested, and the time elapsing between the onset and death. In some cases, spermatogenesis may never have occurred. Mott points out that "Active nuclear proliferation is going on, necessitating an abundant nucleic acid formation, which acid is the main constituent of the heads of the spermatozoa. The failure of nuclear activity in the testicle in dementia praecox is very important in view of Nissl's and Alzheimer's demonstration that the essential histologic change in the nerve cells in this disease is one of nuclear decay. "The critical dementia praecox period of life is adolescence, when the sexual function matures. This affords evidence of the important relation between the sexual function and disease of the mind." The question then arises, is a regressive atrophy of the reproductive organs the cause of mental changes, first by its disturbing influence on the whole endocrine system; second, by the suppression of normal sexual impulse; or third, is it evidence of an inherent lack of vital energy, germinal in origin? At what period this nuclear decay begins, it is difficult to say. It may start before puberty, or later in life. So long as the boy does the work of a boy, he is all right, but when confronted with life's more serious side, with its many ups and downs, he develops a complex and reacts by a mental upset.

People suffering from this type of mental disturbance constitute a large proportion of the patients in insane asylums today. Such individuals, as a rule, go from bad to worse. We may have a patient who gives the history as a school-boy of being "queer" and apathetic, and who may or may not do well in his studies, depending upon the amount of work he is asked to do. This boy suddenly decides that he wants to stop school and go into business for himself, but, in trying to concentrate on any one line, he finds it impossible to focus his attention, and vacillates back and forth through half a dozen forms of industry, usually complaining that his associates "have it in for him" and are not "giving him a square deal," either from a social or financial standpoint. I recently had a young man under my care who presented the above picture. He went into the brokerage business with his brother-in-law, suddenly made up his mind that his partner was cheating him, and proposed to sell out. The boy went to South Carolina, wishing to get away from destructive outside interest and strike out for himself. At this time his mental upset had developed to such an extent that he claimed people were following him, watching and criticizing his every movement. He said that the police of Charleston had been notified of his arrival and, although he did go into the cigar business, he lasted only a very few days, because "they watched him so closely they ruined his business." As a matter of fact he was in the throes of a complete upset, and fell into a state of amnesia of about two weeks' duration, during which time he was brought to Norfolk. After a few weeks of institutional treatment he cleared up sufficiently to go home under family care, where he spent his time trying to write poetry and songs. He has had remissions, one after another up to the present time. This boy had been in the Army and was sent overseas, but was never able to go to the front or take part in the war activities. Just how far the army life furthered his wretched condition, I am unable to say.

When we consider the types of disease that are conducive to mental unbalance, we first recognize the necessity of proving or disproving the presence of brain syphilis, especially paresis. There is a difference of opinion as to how soon after infection, mental disturbances arise from paresis. Some writers claim that

they may appear as early as the second or third month after the appearance of the initial lesion. Naunyn, in a study of 335 cases, reported forty-eight per cent. developed signs of cerebral syphilis within three years after infection. On the other hand, forty years have been known to elapse before cerebral symptoms manifest themselves. In the two cases I have to report, there were intervals of eleven and twenty years respectively between infection and manifestations of mental disturbance, but in this regard, it must be remembered that these statistics are not necessarily authentic, depending as they do on the word of a paretic after his condition began to improve.

The mental state of a paretic, while apt to be despondent, may, on the other hand, show marked excitement, as in the two cases I have to report. The first case was that of a white man of 46, a dairyman by trade, who came to me in January, 1921. He was a poorly nourished, greatly emaciated individual, weighing only 94 pounds. His family history gave no evidence of tuberculosis nor any serious mental disturbance. There had been one child who was a moron. Neurological examination of this man disclosed the following symptoms. All deep reflexes exaggerated, pupils fixed; no Babinski; no clonus; slight Romberg. Mentally, he was confused, talking constantly but disoriented as to time, place and persons, had delusions of grandeur and was under the impression that he was actively engaged in trading horses and cattle. His mental trouble was said to have started three weeks before I saw him. He later admitted an initial lesion 20 years earlier. Laboratory findings showed a four plus Wassermann of both blood and spinal fluid, and 20 cells in the fluid. Treatment, which was instituted at once, consisted of six intravenous injections of neo-salvarsan with complete drainage of the canal, coupled with mercury inunctions, and mixed treatment by mouth. His mental state became clearer and his physical condition improved so much that in March he weighed 115 lbs. I did not see him again until July, when he returned for another series of neo-salvarsan injections, with drainage, and two Swift-Ellis treatments with mercury and iodide as above. At this time his spinal fluid Wassermann was four plus and that of his blood two plus. He then weighed 139 pounds, and his whole condition showed marked improvement. The

point in this case, however, which I wish to emphasize, is this: Although the man received repeated intensive treatments, and noted marked improvement, physically and mentally, his Wassermann reaction never fell below four plus in the fluid and two plus in the blood, as long as I had him under observation.

The second case was a white man, formerly night clerk and cashier of a hotel, who came to me in November, 1921, complaining of headache, forgetfulness and cough. He had formerly consulted an internist on the suspicion that he had tuberculosis. This man admitted having had a sore mouth sometime between 1908 and 1910, and one dose of 606 at that time. Examination showed fixed pupils, absent deep reflexes, positive Romberg, 40 cells in his spinal fluid, and four plus Wassermann of both blood and fluid. Mentally he was disoriented, had delusions of grandeur, thought the house was burning up, and was generally excited. A diagnosis of tabo-paresis was made.

This man received six intravenous injections of neo-salvarsan with drainage, mercury inunctions and mixed treatment by mouth. Two months later he was greatly improved, even to his reflexes. He refused to submit to further Wassermann tests but, after three more months, with no other treatment, he returned to his work at the hotel.

There is a difference of opinion as to the efficacy of anti-syphilitic treatment in paresis. One view holds that a meningitic or perivascular infiltration can be reduced, and the spirochete killed, with cessation of toxin formation and inhibition of degenerative changes. (Solomon,³ etc.) Noguchi and Moore,⁴ on the other hand, claim that the spirochetes probably linger in the deep tissue of the cortex, and that anti-syphilitic drugs are prevented by a filtering process from reaching the central nervous system, thus failing to accomplish any therapeutic effect.

On such evidence as we have, some men refuse to treat general paralysis of the insane. But in this, as in any case of human disability, I take the stand that we have nothing to lose and all to gain, as in the cases just discussed. In which I feel that while they may and doubtless will have remissions, I have

been, from a humanitarian standpoint, amply repaid.

310 *Taylor Building.*

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PHYSICAL EXAMINATION OF THE LUNGS IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS.*

By DEAN B. COLE, M. D., Richmond, Virginia.

The patient should be made to feel at ease as far as possible, stripped to the waist and allowed to sit on stool (or straight chair if stool is not available), facing window so light will fall over examiner's shoulders. The physician should also be seated on a stool (if another is available), otherwise on straight chair and should make himself as comfortable as possible. Comfort for both patient and physician is essential. For this reason the examining room should be comfortably warm or cool as the case may be, and as free from noise as possible. Now have patient drop shoulders slightly forward with good muscular relaxation and you are ready to proceed with the examination.

The four means of physical examination of the lungs are inspection; palpation; percussion; and auscultation. These will be considered in the order named.

INSPECTION comes next to auscultation in importance and not infrequently is inspection the most important factor in making a correct diagnosis. Almost at a glance the following facts may be noted: whether patient looks well or ill; is he nervous and excited; is face flushed or does he look pale and anemic; is he well nourished or is he emaciated; is muscular development good or poor—do not confuse muscular development with whether or not a patient is well or poorly nourished for he may have both good muscular development and good nutrition, or either or neither.

Notice patient's build, whether robust or not; type of chest, whether broad, flat, funnel, chicken, long and narrow, barrel, or any combination of these; also type of breathing, whether thoracic, abdominal, or mixed.

After having made a mental or physical note of the above, note patient's chest expansion, whether or not expansion is diminished; if so this would suggest an old tuberculous lesion, or pleural adhesion, or some other mechanical restriction. It may be a relative thing, as in an acute pleurisy or pleurisy with effusion, where the opposite lung is compensating.

Note any lagging, always remembering that this is suggestive of a more acute condition than fibrosis or pleural adhesions. It is frequently advisable to stand up and look down on the patient, using a blue pencil for marking symmetrical points for comparison. At any rate never forget that patient has both a front and back. The scapulae are excellent landmarks for comparison. Make note of any prominences, depressions, retractions, or scoliosis. Also any pulsations, whether normal or abnormal. It is well to always look for apex beat of the heart, for I have known more than one physician to treat a patient for months without discovering that the heart was to the right of the sternum. Observe the condition of the skin, whether moist or dry, profuse sweating, etc. Examine fingers for clubbing, remembering clubbed fingers are suggestive of some chest condition but not necessarily tuberculosis.

PALPATION is used primarily to confirm inspection as to lagging and diminished expansion. This is best done by placing patient against wall, using rather firm pressure with both hands palpating homologous areas. Palpation is also of use in differential diagnosis. In the presence of consolidation, fibrosis, or cavity, one would expect to find vocal fremitus increased. Pleural effusion, thickened pleura, or pneumothorax usually cause a diminution of vocal fremitus. Remember to palpate homologous areas, using light touch, and have patient to say "nine, nine" aloud. Pottenger lays especial emphasis on palpation in determining muscular rigidity or spasm, muscular atrophy, skin tension, and presence or absence of subcutaneous fat. This is of unquestionable value.

PERCUSSION. I will not go into the physics of percussion more than to say its value is

*One of a series of lectures and demonstrations to a class of physicians in the diagnosis of tuberculosis, held under auspices of the Health Bureau, Department of Public Welfare, Richmond, Va., February 15 to April 15, 1923.

based on the fact that sound is produced when an elastic body is made to vibrate by striking. This sound varies from tympany (best gotten over stomach or intestines partially filled with gas) to flatness which is heard when arm or leg is percussed. Between the two extremes of tympany and flatness we have hyper-resonance, resonance, and dulness. Tympany may be gotten over a pneumothorax, a large cavity, or even over deep consolidation, if sufficient normal or partially collapsed lung overlies it.

Hyper-resonance. Compensating lungs and emphysematous lungs frequently give a hyper-resonant note.

Resonance is best elicited high in axillary spaces.

Dulness, decreased resonance, etc., may be produced by anything impairing the lung elasticity, from pneumonic consolidation to slight tuberculous infiltration.

Flatness is most often encountered in pleural effusions.

Remember in percussing chest to have only one finger in apposition to chest wall, use fairly firm pressure, a light stroke delivered from wrist, and compare homologous areas. I prefer to percuss from base upward, but that is a matter largely of preference.

AUSCULTATION is the most important method we have at our disposal for physical diagnosis of lung disease. Not infrequently does our stethoscope show us how little we gain from inspection, palpation, and percussion. As to stethoscope, I think the Ford is the usual preference. At any rate, ear pieces should fit the ears with comfort, and at the same time exclude outside noise; the tubes should be heavy enough and short enough to avoid kinking, and the bell should fit firmly so as not to make any noise in moving. As a general statement, I would say the simpler the stethoscope, the better.

In auscultating the chest, have patient breathe quietly with mouth open and a little more rapidly than normal. Now listen in both axillary spaces to get the normal vesicular breathing for this particular patient, but be sure patient is breathing properly. Now listen over anterior surface of chest (I prefer to begin at base and go up) for any breath changes, remembering that broncho-vesicular breathing occurs normally above and inside a circular line from middle of clavicles through second chondrosternal junction, more marked

on right than on left side. Turn patient around and examine back in same way. Broncho-vesicular breathing is normal at extreme apices and between scapulae near spine, also at left base below angle of the scapula. Remember that broncho-vesicular breathing is characterized by prolonged high pitched expiration and is not normally found outside of areas just mentioned. Abnormal broncho-vesicular breathing leads one to suspect pathology and to think of fibrosis due to tuberculosis as the cause, as this is the most frequent cause.

Be on the alert for suppressed breathing as this is frequently one of the first signs of a developing tuberculosis. After studying the breath sounds, have patient to whisper "one, two," gently during expiratory phase of breathing. Normally the whisper can be heard over about the same areas as normal broncho-vesicular breathing but not elsewhere, except on spine which we will not consider here. This should confirm findings as to the presence or absence of breath changes and frequently is a more delicate means of determining slight variations from the normal.

Now examine for rales in same way but have patient to breathe out gently and cough. He will naturally breathe in if you will make him breathe out and cough at rate of thirty times a minute. Forget everything but rales and listen for them. If present, try to determine their comparative size and their wetness; whether or not they occur in showers; and if more than one kind of rale is present. Also determine if they are superficial or deep, or both, and in just what phase of respiration do they occur, remembering that they may occur at beginning of inspiration, or throughout inspiration; or with or just after cough; or they may occur at any time, apparently at their convenience. One's understanding of rales and accompanying breath changes determines to a great extent his ability to diagnose and prognose tuberculosis. By a careful study of the physical signs can be determined to a great extent the age and extent of the lesion, whether or not it is spreading or has recently spread, and in general, the outlook for the patient. The physical findings, history, symptoms, laboratory findings, and X-ray must all be considered together and correlated finally, but each should be studied individually as if

there were no other evidence.

Before taking up rales I want to mention some of the adventitious sounds that the examiner must be on the lookout for:

- (1) Muscle crackles;
- (2) Sternal crepitations;
- (3) Sterno-costal crepitations;
- (4) Skin crackles;
- (5) Atelectatic rales.

These are all heard at apex of lung.

The first four can be differentiated by having patient hold breath, and moving part in question. *Atelectatic* rales will disappear after three or four deep breaths. *Marginal* rales are heard at base, near margin of lungs, and they are, as a rule, coarse and dry and disappear after patient breathes deeply a few times. They are of no importance. Pleural sounds, rales, or rubs may vary from inspiratory rales to a to-and-fro breathing rub. Unless a pleurisy is well defined it may be difficult to diagnose. Clicks cannot be described better than the term itself. They may occur in any part of the chest at any time and are generally of no significance.

RALES

There are many classifications of rales. Personally, I prefer the one used by Colonel Bushnell, which is about as follows:

Crepitant and subcrepitant: Occur in showers in inspiration, and inspiration only. Found in acute inflammations as pneumonia, or a recent extension of a tuberculous process, which pathologically is a pneumonic process. (The atelectatic rale, and rale of an almost healed lesion, is a fine rale, and frequently has many of the characteristics of crepitant and subcrepitant rales.)

Indeterminate Rales: The indeterminate rale occurs at any phase of respiration or may occur throughout respiration and cough; may sound superficial, or deep, or both. It has no regard for time or place.

Small and medium moist. Most often heard in tuberculosis. Always denote chronicity.

Large moist. Frequently heard in last stages of tuberculosis or beginning cavity formation. Also heard in edema of lungs and sometimes in bronchitis.

Bubbling or Gurgling Rales: Usually heard in cavity formation. May be produced in large bronchi. If caused by tuberculosis, never found in earlier stages of the disease.

Sibilant and Sonorous Rales: Rales of bron-

chitis. These rales may be musical or noisy and usually it is impossible to diagnose or rule out tuberculosis when these rales are present.

Metallic tinkle, succussion splash, etc., do not occur in uncomplicated pulmonary tuberculosis, so will not be considered here.

For diagnosis of pulmonary tuberculosis on physical findings *alone* the signs *must* be in the upper half of the chest. Tuberculosis *usually* invades the upper portion of the lungs and not the lower. However, if the lesion is basal, tuberculosis should be ruled out or diagnosed by means of history and symptoms or by the X-ray or the microscope.

For a *definite* diagnosis of tuberculosis one or more of the following should be present:

- (1) Tubercle bacilli in sputum.
- (2) Small or medium moist rales (called by many moderately coarse) in upper half of chest. Diagnosis may be made on finding subcrepitant or sometimes other rales with breath changes, but here history, symptoms, etc., must be considered.
- (3) Parenchymatous X-ray lesion.
- (4) History of hemoptysis of a dram or more.
- (5) Pleurisy with effusion.

Positive diagnosis may be made on presence of either 1, 2 or 3, or both 4 and 5. If either 4 or 5 be present, tuberculosis is nearly always the cause.

One positive sputum, if reliable, makes the diagnosis of tuberculosis unquestionable. One negative sputum is of little value, so, where in doubt, continue to have sputum examined until some definite diagnosis can be made.

2609 Hanover Avenue.

PROPHYLAXIS OF TUBERCULOSIS.*

By H. R. EDWARDS, M. D., Richmond, Virginia.
Clinician, Bureau of Tuberculosis Education, State Board of Health.

As is natural, a physician engaged in public health work must place in the forefront prophylaxis rather than cure; and I venture to say that, so far as tuberculosis may be concerned, it would be difficult to find any authority who might feel inclined to accept the other order of importance.

Under the heading, "Prophylaxis," we will have to include precautions; and if we are able

*One of a series of lectures and demonstrations to a class of physicians in tuberculosis, held under auspices of the Health Bureau, Department of Public Welfare, Richmond, Va., February 15 to April 15, 1923.

to utilize our knowledge in this respect, not specifically but generally, it is safe to say that tuberculosis would become increasingly rare among human beings and that finally it would disappear.

I shall not here discuss publicity or propaganda. It is too complicated and varied to be condensed within the scope of a single paper. It is one of the most important single agencies in the battle with tuberculosis. In all branches of public health work, the people have to be prepared for efforts in their behalf, feeling naturally antagonistic to things that are beyond their knowledge; and in no branch of the work is education more essential than in tuberculosis. Hence we have the importance of "Propaganda."

There are two governmental functions that might be called essential to the control of tuberculosis. There should be adequate and general inspection of dairies and slaughter houses. No milk should be sold unless the producing cow has been tuberculin tested. Protection in these lines is partial; but it should be general. There should be actually compulsory registration of cases of tuberculosis. We have a Virginia law requiring this registration but it has never been enforced. We are now endeavoring to effect compliance with the law and are meeting with a fairly favorable response; but our efforts must not stop with persuasion if we should find persuasion to be ineffective.

The need for registration cannot be over-emphasized. Health officers are powerless to follow up cases when they are ignorant of the existence of the trouble; but when cases are reported, personal and written or printed advice can be given, so the patient may have a better chance of recovery and those near him have a better chance of escaping infection.

As to specific methods for application to individual cases, there should be special efforts made to reduce or remove predispositions to tuberculosis where there has been definite exposure to the disease. Children in families which have tuberculous histories or in which there is a present case of tuberculosis should be carefully examined and regularly weighed. Their dietetic conditions should be safeguarded; needed corrections, such as the removal of diseased tonsils or surplus adenoids, should be made; and the teeth of such children should receive particular attention.

From the viewpoint of either prevention or cure, treatment under ideal conditions is necessarily an expensive procedure, generally beyond the limits of the public purse and frequently too much for private means. Change of climate and surroundings, and the many conveniences that a sick person might reasonably wish, are not within the reach of the average case and are beyond the sphere of public health endeavor; but this handicap to the realization of an ideal should not discourage us.

For, indeed, it is a reassuring fact that our knowledge of tuberculosis and its treatment has in recent years broadened so that now we find ourselves able to cure the trouble anywhere if we find a co-operative patient, eager to be cured and willing to utilize all the aids we give him. This is a very fortunate condition; because the majority of the cases must depend upon home treatment; and it is not likely that ultimately home treatment will supersede sanatorial care.

This feature is here introduced because open-air sleeping is one of the principal features of sanatorial care. Sleeping porches as a preventive aid are eminently desirable; but if it is impracticable to provide a sleeping porch for the child who is to be protected, it is rarely, if ever, impossible to secure for him a room with adequate ventilation and abundance of fresh air. In a well ventilated room into which a constant supply of fresh air is coming, a child should sleep at least ten hours each night. Less than that period is not enough.

Cleanliness is a large factor in prophylaxis, and poverty is no excuse for filth. The house should be clean and the child should be clean. We should bathe frequently and be particularly careful about cleaning the teeth.

Regular living is necessary. Meals should be given at regular hours and the diet should receive particular attention. Milk, and plenty of it should be given; eggs, cereals, vegetables, and meat in moderation should be included in the fare. Abstention from tea or coffee will help to make the child strong and increase its resistance.

Children who are receiving this prophylactic attention should be carefully watched during and following any of the acute fevers, such as measles, scarlet fever, or pertussis; and particular attention should be given them if they

develop any condition that tends to weaken the lungs.

With minor variations, on the whole very similar treatment can be given to the adult as to the child. Whenever a case of tuberculosis has been located it is advisable for the rest of the family to use the same precautions that are recommended for the patient. It is practically certain that all of them have received the infection, and it is virtually sure that some of them may be developing active disease, which, if taken in time, will probably heal and give no further trouble.

Dissipation in any form should be avoided by those who are trying to avert tuberculosis. Regularity of living habits is a prime necessity for keeping fit.

Cold bathing is a great aid to the hardening process and is very necessary in the cure of tuberculosis. If a man accustoms himself to the cold bath by gradually reducing the temperature, he will suffer little discomfort and his body will become inured to changes of temperature, his pores will be toned and elimination increased. All these are factors that lessen susceptibility to tuberculosis.

Fresh air is a necessity not only at night but at all times. Those who work in unsanitary buildings that are poorly ventilated should, if possible, change to better quarters; but, if that is impracticable, they should at least be certain of proper ventilation and of clean surroundings.

Where there is a definite case of tuberculosis, certain precautions should be observed, if the others in the family are to be protected. The sputum of the patient must be burned. Sputum cups are so cheap that almost anybody can afford to buy them; but inability to buy need not prevent their use. There are a number of philanthropic organizations that will gladly give the cups to the men or women who cannot buy them. If the patient does not get the cups or does not have one available when he feels the need of expectoration, he should spit into a paper napkin or a newspaper. Whatever he uses for a receptacle should later be burned. The only exception to this rule that should be tolerated is the use of a glass vessel containing a strong liquid disinfectant and having a tight cover which should not be removed except when the container is being used or cleaned. If any sputum from a tuberculous patient should be spilled, it must be

wiped up while moist, with a rag or paper soaked in lysol or mercury bichloride solution.

The patient should keep in his pocket pieces of gauze so folded that after they have been used to cover a cough or a sneeze, they will not allow the moistened part to come into contact with the hands of the patient. It is inexcusable for a tuberculous patient to cough or sneeze without covering his mouth and nose.

These pieces of gauze, just like the sputum cups, should be burned daily. The patient should have with him a container or envelop of some sort for the used gauze. They should never be folded and stuck into his pockets. Used pieces should never be placed with the unused ones.

All dishes used by the patient should be used only by him. They should be washed separately from the dishes used by the rest of the household. Hot soap suds and water should be used for cleaning them, and subsequently they should be rinsed in boiling water. If these precautions are taken a tuberculous patient is not likely to be a source of danger to those near him.

In fact, it may be said that, if any one suffering from tuberculosis is careful in his personal habits and so places his sputum that it cannot get to another person, and if his attendant is careful to see that his table utensils are properly sterilized and kept away from others, people in a home where there is a tuberculous patient are as safe as they would be in an average home, and far safer than they would be where there are careless coughers and sneezers.

THE DIFFERENTIAL DIAGNOSIS OF PULMONARY TUBERCULOSIS.*

By W. NELSON MERCER, M. D., Richmond, Va.
Director, Tuberculosis Division, Health Bureau.

First we will consider the physical signs elicited in diagnosing the various lesions in pulmonary tuberculosis, and then the differential diagnosis of this disease.

The important question is to determine whether the signs present indicate a healed or an active lesion. Persistent moist rales, heard after expiration and cough, are the only reli-

*One of a series of lectures and demonstrations to a class of physicians in tuberculosis, held under auspices of the Health Bureau, Department of Public Welfare, Richmond, Va., February 15 to April 15, 1923.

able signs of activity in pulmonary tuberculosis. The common physical signs are harshness of respiratory sounds, prolongation of expiration, increased conduction of voice, and more or less dullness on percussion, all of which are usually caused by an advanced process, and very rarely by acute inflammation. When these signs occur in an early case, the patient is usually febrile and evidently ill. In cases of ambulant subjects in apparently good health, the presumption is that the above signs indicate an old, not an early lesion.

THE ACUTE LESION.

If small, this lesion is manifested by rales with or without changes in breath sounds, percussion note, and voice transmission. The more acute the lesion, the greater probability that its presence will be indicated only by rales. If of large extent, the lesion is distinctly a broncho-pneumonia, characterized at first by the usual signs of pneumonia, crepitant and subcrepitant rales; when caseated, by absence of rales, except coarse and distant rales from the larger bronchi, also by impairment of expansion of the lung, and more or less dullness or tympanitic resonance; when breaking down, the lesion shows signs of a cavity and the presence of gurgling rales of varying size.

THE ACTIVE CHRONIC LOCALIZED LESION.

Activity is denoted by the presence of rales, together with the other signs described under the arrested lesion, but the rales do not of necessity show that the lesion is extending, nor that the activity is of much clinical importance. The more active and recent the chronic lesion, the less marked the breath changes and the more conspicuous the rales.

THE ARRESTED CHRONIC LESION.

The arrest of a lesion is characterized by the absence of rales. The signs elicited are harshness of breath sounds, prolongation of expiration, increased vocal fremitus and resonance, and by varying degrees of dullness on percussion.

DISSEMINATED TUBERCULOSIS.

The peribronchial type is common and frequently not recognized. It may be manifested only by distant rales with or without slight changes in breath sounds, usually bronchovesicular. If well marked, there will be lagging on the affected side and increased vocal resonance. Less pronounced cases are dis-

tinguished from chronic bronchitis by the character of the rales (coarser in bronchitis) and by their distribution. More frequently the peribronchial type is found with a superficial focus, in which case bronchovesicular breathing with or without rales may extend some distance below the limits of the focus. Extension to the formerly sound lung is the most important point of diagnosis in the peribronchial type. There may be a small apparently arrested lesion on one side, usually the right, with signs of extension involving the whole or greater part of the other lung manifested only by rales after expiration and cough. In ambulant afebrile patients, harshness of breath sounds and prolongation of expiration indicate an old lesion, while the more acute the lesion the greater significance have the rales and less marked are the breath changes. The possible signs elicited in the disseminated type of pulmonary tuberculosis are: diminished expansion at the base, increased tactile fremitus, shorter high-pitched note with heavy percussion, slightly prolonged expiration, rales (often indeterminate) heard near the margin of the sternum in the second, third, or fourth interspaces, and between the scapulae behind (heard after expiration and cough), and sometimes an area of pectoriloquy.

THE DIFFERENTIAL DIAGNOSIS OF PULMONARY TUBERCULOSIS.

It has been shown by various workers in tuberculosis sanatoria that a number of patients admitted as having active tuberculous lesions in the lungs have been proven non-tuberculous, or no active lesions could be found. Among 198 autopsies at the Boston Consumptives' Hospital, 23 cases or 11.5% proved to be non-tuberculous or had no active lesion. In other sanatoria 353 necropsies revealed 38, or 10.8% non-tuberculous. Many hospitals have a large number of "negative sputum" cases, some as high as 50%, which would indicate that mistakes in differential diagnosis are sometimes made, and, therefore, it behooves us to devote sufficient time and care in utilizing all the means at our disposal in the city to reach a correct diagnosis in justice to our patients and to the welfare organizations concerned in their aid and treatment.

For convenience, we will divide the conditions to be considered into two main groups, as follows:

1. Those in which suspicious symptoms predominate.

2. Those presenting definite physical signs in the lungs.

1. CASES IN WHICH SUSPICIOUS SYMPTOMS PREDOMINATE.

General Asthenia.—These patients are usually women or children who are constitutionally frail, below average weight, have little endurance, and may present symptoms of nervousness, irritability, indigestion, headache, etc., without definite cause. They may have frequent colds and other infections and simulate tuberculosis closely. They should be kept under prolonged observation, and repeated examinations are indicated to make a definite diagnosis. Careful supervision of their daily life will probably restore them to good health, and watchful oversight by the physician will generally produce most favorable results.

Neurasthenia.—This group is similar to the last, but having more pronounced nervous symptoms. The nervous symptoms may be due to tuberculous toxemia, but more often they are not. Prolonged observation with supervision of the patient's mode of life not only makes the correct diagnosis but also is the treatment indicated whether the patient is tuberculous or not.

Hyperthyroidism and Other Endocrine Disturbances.—Malaise, loss of weight, nervousness, digestive disorders, and sometimes a chronic cough, when the thyroid is enlarged, are the usual symptoms. Upon examination, these patients are found to be poorly nourished, have a rapid pulse, are easily fatigued, and may have a slight afternoon rise of temperature increased by exertion or excitement. General examination shows the fine tremor in the fingers, tachycardia, slight enlargement of the thyroid gland, exaggerated tendon reflexes, and possibly exophthalmos—typical signs of hyperthyroidism. The Goetsch adrenalin test and the basal metabolism rate may be of use in borderline cases. Where disturbed balance of the various internal secretions is present, nervousness and malnutrition associated with ovarian or adrenal symptoms may occur. Observation and regulation of the life of the patient over a prolonged period, and probably the use of extracts of animal ductless glands, or in some cases of hyperthyroidism, surgical intervention, result satisfactorily and make the diagnosis.

Fever of Obscure Origin.—(a) Typhoid and Paratyphoid Fevers: Frontal headache, epistaxis, enlargement of the spleen, continued fever without marked morning remissions, and later, tympanites, rose spots, positive Widal and blood culture, make the diagnosis of typhoid. But no other signs than fever often appear for a week or ten days before the above definite signs are evident. If bronchitis complicates typhoid, the differential diagnosis is more difficult. The signs in the chest are not localized, are bilateral at the bases, and vary in location and extent. The early active febrile stage of pulmonary tuberculosis will probably subside in two or three weeks if the patient be put to bed. Repeated examinations of the chest and sputum, and X-ray study will make the correct diagnosis.

(b) Malaria: The symptoms of pulmonary tuberculosis are often mistaken for malaria, but if proper care is taken in getting the history, examining the chest, daily temperature record, blood examination for the malaria plasmodium, sputum examination for tubercle bacilli, and rest in bed, the diagnosis will be made without delay.

(c) Influenza: The diagnosis of "grippe" is often made when other conditions exist, and early localized tuberculosis is most frequently overlooked by physicians, when careful search for signs in the chest combined with sputum and X-ray examination would clear up the diagnosis. Whenever cough and fever continue after the acute stage, tuberculosis should always be suspected.

(d) Focal Infection: In this group of conditions with some constitutional reaction, chest pains, and probably cough, the differential diagnosis from obscure tuberculous lesions is rather difficult. The teeth, tonsils, sinuses, intestines, and genito-urinary tract are usually the seat of such foci, and in doubtful cases should be investigated as the source of infection, after careful examination of the lungs fails to reveal evidence of pulmonary tuberculosis. Irregular fevers will often cease when the focus of infection is removed.

In the above group of conditions with indefinite constitutional symptoms, pulmonary tuberculosis should always be suspected because of its frequency, and with patience and care in the search for direct evidence the correct diagnosis can usually be made.

2. CASES PRESENTING PHYSICAL SIGNS IN THE LUNGS.

Tuberculous Infection and Tuberculous Disease.—Thus far we have considered the interpretation of general symptoms akin to those associated with pulmonary tuberculosis, and we have found that suitable regulation of the daily life of the patient while he is under observation is of marked value both for diagnosis and treatment of the condition whatever it may be. More difficult are the cases which present slight variations upon physical examination of the lungs. Tuberculous infection is denoted by the signs of slight impairment of resonance, slight alteration in the breath sounds, or fine crackling rales in an apex. When such signs are found, the lesion is of the inactive fibroid type unless accompanied by constitutional evidence of active disease, and it is best determined by repeated examination of the chest and careful observation of the temperature, pulse, fatigue, nutrition, digestion, etc., but without these symptoms the diagnosis of active clinical tuberculosis is not justified upon these physical signs alone.

Conditions Presenting Marked Physical Signs.—Mistakes in diagnosis by the general practitioner in this group of cases are more frequent, due to the need of consultation with those who specialize in pulmonary diseases.

The physical signs are generally marked and extensive, with cough and expectoration. Repeated examination of the sputum for tubercle bacilli, and X-ray study will often clear up the diagnosis. Negative sputum in extensive tuberculosis is extremely rare.

(a) Emphysema and Chronic Bronchitis: This condition is often confused with pulmonary tuberculosis, but the diagnosis can be made by a history of chronic cough worse in winter months, asthma with dyspnea and signs of emphysema, negative sputum for tuberculosis, and coarse rales which are bilateral and inconstant. This condition usually occurs in older people and may be accompanied by chronic tuberculous lesions in the apices with or without tubercle bacilli in the sputum. "Tuberculosis carriers" are often met with in this group which may have been unrecognized as such for years, and they are a constant source of infection to others. Repeated examinations of the sputum and X-ray plates should be made in difficult cases of this group.

(b) Peribronchitis or Chronic Bronchopneu-

monia: This group is very common, usually following influenza, and may be caused by the pneumococcus, influenza bacillus, or the streptococcus. Symptoms are mild, fever a few days, cough and expectoration, and possibly some hemoptysis. Following influenza the upper air passages and sinuses are often involved. The physical signs are those of infiltration which occur in the lower lobes. The diagnosis is made on the absence of constitutional symptoms with extensive physical signs throughout the chest, negative sputum for tubercle bacilli, but showing the above microorganisms of acute respiratory infection, X-ray picture of linear peribronchial markings slightly increased, and the clearing up of symptoms and signs in a shorter time than similar tuberculous lesions usually require.

(c) Bronchiectasis: Chronic cough, expectoration of large quantities of purulent and foul sputum at intervals, loss of weight, fatigue, dyspnea, cyanosis, fever 99.5 to 101 at times, and possibly hemoptysis, continue for years. The physical signs are indefinite, due to the lesions being either single or multiple and bilateral and they are located usually in the lower lobes of the lungs but may extend upward. If single, signs of consolidation, pleuritic adhesions, or a cavity will be found in the lower part of the chest posteriorly, but when multiple and bilateral the signs are those of a chronic bronchitis with emphysema. Cavities usually form in the lower lobes, rarely in the upper.

The X-ray picture, the characteristic foul sputum which separates into three layers—greenish-yellow, straw, and frothy yellow—negative for tubercle bacilli, the history of the case, and the physical findings will make the diagnosis.

(d) Abscess of the lung usually follows operations on the tonsils or jaws and is preceded by aspiration pneumonia or septic pulmonary embolism. High fever, sweating, emaciation, cough with expectoration of large quantities of brownish, foul, sputum without tubercle bacilli, and probably hemoptysis or hemorrhage form the clinical picture. The physical signs are usually in a lower lobe, the apex remaining clear.

(e) Gangrene of the lung may follow aspiration pneumonia, pulmonary embolism, or the presence of foreign bodies in the bronchi. The symptoms of gangrene of the lung are irregu-

lar high fever, prostration, cough, and large quantities of fluid, fetid, and frothy sputum with particles of lung tissue in the lower layer. X-ray study and sputum examinations aid in the diagnosis.

(f) Cancer of the Lung: Sarcoma and carcinoma of the bronchi, lungs, and pleura may present symptoms similar to pulmonary tuberculosis in the early stage—low grade temperature, cough, hemoptysis, loss of weight. Pressure of the tumor may cause enlarged veins on the chest wall and shoulder or neck and possibly dilatation of the pupil on the affected side with dyspnea as the tumor enlarges. Cachexia, with a waxy-yellow color and blanching of the face, appears in contrast to the feverish appearance seen in tuberculosis. Emaciation is evident much earlier in tuberculosis than in malignant disease of the lung. The physical signs over the tumor are flatness, feeble or absent breath sounds without any rales in the circumscribed area, and above the area of flatness there is an area of resonance, which does not occur in tuberculosis.

When fluid complicates cancer of the lung or pleura the pressure signs given above are more apt to occur than in other conditions, and upon aspiration of the chest, if blood be found, it is strongly indicative of malignancy. The presence of coarsely granular eosinophile cells in the fluid would point to cancer of the lung. The sputum is negative for tubercle bacilli and small in quantity. The diagnosis is made by the symptoms, physical signs, and the X-ray.

(g) Actinomycosis: In the early stages the symptoms resemble tuberculosis—loss of weight, cough, fever, etc., later a fluctuating swelling in the chest wall with signs of pleural effusion appears. The sputum and pus from the swelling show the streaks of actinomycotic growth.

(h) Streptotrichosis of the Lung: The diagnosis can only be made by microscopic examination of the sputum for the streptothrix, as the symptoms resemble tuberculosis closely.

(i) Spirochetosis—Hemorrhagic Bronchitis: The symptoms are cough, copious expectoration, but no fever in most cases, while the general condition of the patient remains excellent. The character of the sputum makes the diagnosis alone as it is viscous and thick throughout, is much like the juice of gooseberries, and contains the spirocheta bronchialis.

(j) Cardiac Diseases: Organic heart disease, notably mitral stenosis, often causes cough, expectoration, hemoptysis, mild fever, and emaciation which would lead to a diagnosis of tuberculosis, but upon careful examination the cardiac lesion will be heard as a presystolic murmur within the apex of the heart. The area of cardiac dullness is usually enlarged in these cases, and the first sound of the heart has a slapping quality. Dyspnea is more marked in cardiac cases than in the tuberculous, and rest for a few days will relieve it in cases of heart disease. In all cases with lesions of the mitral valve and dilatation of the heart showing inconstant rales in the lower part of both lungs, it is safer not to diagnose pulmonary tuberculosis unless tubercle bacilli are found in the sputum.

(k) Syphilis of the Lung: This is very rare and difficult to diagnose when present. There are cough, expectoration, slight fever, loss of weight, and sometimes blood spitting. The lesions are usually in the lower lobes and accompanied by other signs of syphilis in the bones, skin, larynx, etc. X-ray pictures and repeated negative sputum examinations will aid in the diagnosis, but a positive Wassermann reaction will frequently be found in patients who have both syphilis and tuberculosis and is therefore not absolutely reliable in differentiating these diseases. The therapeutic test of salvarsan and mercury in positive Wassermann cases with other suggestive signs of syphilis will often clear up the pathology which is the result of luetic infection.

Osler found only twelve cases of pulmonary syphilis in 2,500 autopsies at Johns Hopkins; and only two cases in 6,000 at the Copenhagen Hospital were proven to be such post-mortem.

Room 409, City Hall.

GRANULOMA INGUINALE.*

By CLYDE F. ROSS, M. D., Richmond, Va.
Associate in Genito-Urinary Surgery, Medical College of Virginia.

Granuloma Inguinale is also known as "Ulcerating Granuloma of the Pudenda," "Granuloma Venereum," "Serpiginous Ulceration of the Genitals," "Groin Ulceration," etc., but none of these names seems to describe the condition in its various manifestations. They all imply it is a disease of the genital regions when

*From the Urologic Service of the Medical College of Virginia.
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such is not always the case, so in reality we have no exact terminology for the condition.

Granuloma, for as such will it be spoken of in this article, was originally thought to have been solely a tropical disease having been first reported by Conyers and Daniels¹ in 1896 as occurring in the British tropical possessions, but now the disease has been recognized in the United States and we realize it has been present for years but diagnosed under other names. Randall² states it has been present in Philadelphia for fifty years and has been recognized but wrongly diagnosed for twenty-five years. In 1920 Symmers³ reported two cases from the Bellevue Hospital, having been assisted in arriving at a correct diagnosis by a South American surgeon who was visiting the hospital at that time. This condition first came under my observation during the summer of 1918 at the Base Hospital, Camp Greene, N. C. There were mobilized drafted colored troops from North Carolina, South Carolina and Tennessee. I remember several cases diagnosed as syphilis, for want of a more correct diagnosis, which I now know were in reality granuloma. Some of these patients may have had positive Wassermanns but anti-syphilitic treatment had no effect upon the lesions and the patients were given surgeons' certificates of disability and discharged. Upon coming to Richmond I was again confronted with this condition, but not until Symmers published his article did we know its true nature and its cure.

Up to the time we reported seven cases before the Medical Society of Virginia in Lynchburg⁴ in 1921, there had been only twenty-seven cases reported in the United States by five different writers, but since that time there have been a number of cases reported from those sections of the States particularly where the negro resides. In this report we wish to add ten more cases to our previously reported seven.

Granuloma may be defined as a chronic infectious ulcerating granulating disease, occurring in any part of the body but mostly on or around the genital organs, with no tendency to glandular involvement or serious impairment of health.

The causative organism has not been definitely placed although the consensus of opinion is that it is due to an intracellular encapsulated organism found in large mononuclear cells and known as Donovan's body after Donovan⁵ who first found it in 1905. Others, notably

Driscoll⁶, believe it is due to a symbiosis of the spirillum and the fusiform bacillus, the same organisms causing Vincent's angina and erosive or gangrenous balanitis (fourth venereal disease). Randall has done a great deal of work in trying to prove Donovan's body the true cause but has never been able to reproduce the disease. In three of his sixteen cases an organism was cultured which resembled the organism seen in the mononuclear cells. He as well as Symmers, Campbell⁷, Lynch⁸, and others have found the Donovan's body almost universally present in their reported cases, while Aragao⁹ claims the organism is pathognomonic of the disease. We have been very unfortunate in our attempts to locate the organism. Seven patients were examined with positive findings of the Donovan body in only one case and the spirillum in two. In the one case in which the Donovan body was located we also found the spirillum. Two patients are now undergoing examinations and in eight no attempt was made to locate organisms.

Its mode of transmission is also as yet undetermined. We do not believe it is venereal in origin for in all of our cases, with possibly one exception, we have never known of one patient conveying it to another, yet there are histories of men and women living together with no transmission of the disease. It may prove to be an insect borne disease as by the pediculosis pubis.

Conyers and Daniels¹ give the following description of the microscopic picture with which we agree and upon which we have depended along with clinical findings for a diagnosis:

"The mass of nodules are composed of round cells, with a large (but usually badly staining) nucleus, contained in a delicate reticulum of fibrous tissue. This mass is covered by epithelium in its greater extent and in the older and larger nodules merges gradually into a subadjacent dense fibrous stroma in which small masses of similar rounded cells are embedded. The growths are very vascular and the capillaries are much dilated, but there are no hemorrhages. There is no sign of suppuration or caseation, and no giant cells are found in any of the sections. The overlying epithelium has undergone certain modifications; it is usually intact; or cracked and occasionally over small areas absent or ill formed, and the cells of the rete malpighii are ill defined and swollen. None of the pigment so characteristic of the colored race is found in

the deeper layers. In many specimens there is a proliferation of the interpapillary epithelium, in some, sufficient for columns of epithelial cells to appear to descend into the round celled growth. In some, on the other hand, the papillae have almost disappeared from a more widespread proliferation of the epithelium. The hair follicles in many cases share the epidemic thickening, and the hairs grow strongly and are not changed in color. In a section of a small nodule the round cell mass will be found to be roughly wedge-shaped, the base of the wedge being towards the skin, the growth ascending with the vessels into the papillae."

The lesions seem to be both primary and secondary in origin. When beginning primarily, it may start as a papule, pustule, or nodule which ulcerates, and upon the base of this ulcer granulations appear and spread by contiguity or usually by continuity of tissue. If it is secondary in origin, the infection seems to be engrafted upon some prior lesion as an inguinal bubo. Fourteen of our cases were primary and three secondary. The three latter were secondary infections of buboes.

The lesion presents itself as a light red mass of granulation tissue which in the older cases ulcerates in the center and heals, leaving a firm raised cicatricial area covered by very thin epithelium. The granulating areas vary in the amount of elevation but are usually more raised at their margins and depressed in the center. They are covered by a thin, pearly grey scab and, except in moist regions, have very little secretion. This secretion may be fetid or not.

At times, instead of there being tissue proliferation, there is ulceration with great destruction of tissue, particularly so if the lesions affect the glans penis, prepuce, or vulvae. When healed, the scar tissue often contracts and produces deformities, especially so if it involves the urethra, vagina, or anus. Instead of the disease being at all times of long continued duration, there seems to be an acute form of very rapid destruction.

In our male patients the lesions were confined to the glans penis and prepuce in four cases, and in the other nine there was an involvement of the inguinal region in every case, with extension to other parts in some cases. In one of the latter there was an involvement of the mouth, nose and throat. The typical inguinal granuloma begins in the inguinal

region, either on one or both sides, extends upward towards the anterior superior spine and downwards into the inguinal folds. If untreated, it will spread over the perineum, around the folds of the nates and up over the sacral region. None of our recent cases have been so extensive, as the diagnosis has been made during the early stages.

In our female patients the vulvae seem to be the site of predilection as in all four the vulvae were involved, with involvement of the inguinal region in two cases. In two cases there were extragenital lesions, one involving the neck and another involving the mouth, showing a high percentage of lesions out of their normal location.

The lymph nodes are not involved and the subjective symptoms are slight. All of our patients have been in the colored race, although Randall and Lynch both report one case each in the white race. By men doing work among both sexes, it is reported as freely in one sex as the other. The female cases reported by us have been only those seen in consultation.

In the past these lesions have been variously diagnosed chancreoid ulcers, syphilis, condylomata acuminata, tuberculosis cutis, and epithelioma. Except when secondarily infected, it does not resemble the chancreoid ulcer in that it has not the ulcerated undermined edges nor the foul purulent discharge of the chancreoid lesion.

Since the advent of the Wassermann and arsenic therapy, it is not so often confused with syphilitic lesions. Although a number of these patients showed a positive Wassermann, yet anti-syphilitic treatment had no effect upon the lesions. In fact nearly all of our patients had had arsphenamine with no improvement, whether they had positive Wassermanns or not. The absence of the tubercular bacilli, the clinical and the pathological findings should serve to distinguish granuloma from tuberculosis cutis. The presence of glandular enlargement, metastasis, and the pathological picture should differentiate malignant disease from granuloma.

Until the organism causing the disease can be positively identified, the diagnosis will rest upon clinical findings, pathological examination of sections, and the results of antimitomonal therapy. Any granulating or ulcerating lesion around the genitals or located elsewhere, resistant to ordinary surgical treatment, unimproved by anti-syphilitic remedies, of long

duration, devoid of pain, should be given the advantage of tartar emetic therapy.

In antimony and potassium tartrate we have added one more drug to our list of specifics and most likely opened up a new field in drug therapy. Recent literature refers to its beneficial action in bilharziasis, filariasis, gangosa, cachar sore, malaria, leishmaniasis, and trypanosomiasis. We have yet to see a case of granuloma which could not be cured by its use and in our experience with drugs none has shown the marvelous healing powers as tartar emetic in this disease.

Antimony and potassium tartrate were first used in the treatment of granuloma by Aragao and Vianna in 1912, but the success attained was not so great until its was used intravenously. Hoffman¹⁰ first reported its use intravenously in 1920. In our seventeen cases, thirteen were healed, two discontinued treatment, and two are now undergoing treatment with great improvement.

The U. S. P. Tartar Emetic (Antimony and Potassium Tartrate) in sterile distilled water is used intravenously in one per cent solution. The initial dose is 5 c.c. and is increased one c.c. each dose until 10 to 12 c.c. are given at a dose. This amount was diluted up to 25 c.c. by sterile distilled water and injected three times a week. Improvement is usually noticed after three or four injections. The drug in some patients causes immediate vomiting which lasts only a short time. To prevent this all patients are instructed to return for treatment with empty stomachs. We have never experienced any severe untoward symptoms. The oral administration of tartar emetic has not been attended with visible improvement. Caution should be observed not to spill any of the solution into the tissues as the results are very distressing. After lesions have healed, treatment should be continued weekly for three months to prevent recurrence. This after-treatment is very essential and should not be neglected. In two cases where it was neglected, there were recurrences which responded readily to more treatment.

Owing to the fact we have as yet no complement fixation test for granuloma, as we have in syphilis, it is impossible to say if these patients are cured or just temporarily relieved. It may be found necessary to repeat courses of treatment in this disease every year as we do in syphilis.

In our seventeen cases, ages ranged from

seventeen to fifty years. Thirteen were males and four females. Fourteen were primary and three secondary. Duration of the disease was from one month to eleven years, as follows: one, eleven years; three, ten years; one, eight years; one, seven years; two, two years; five, one year; and four, less than one year. The amount of tartar emetic given was from six to forty grains and the period of treatment extended from two to six weeks.

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501 *Professional Building.*

EMPYEMA.*

By J. K. GRAY, M. D., Marion, Va.

During the past five years there has been a greater incidence of empyema among both the civil and military population than has ever been noted previously, and special advantages for the study of this disease have been afforded by the comparison of the various methods of treatment as carried out upon large groups of cases. Much has been learned during this time and the mortality has been markedly lowered by a clearer understanding of the physiologic and pathologic processes involved and the formulation of better and more individualized methods of treatment. It seems opportune at this time to present for your consideration a review of the established principles in the diagnosis and treatment of this condition and in addition such data as will modify or change them.

ETIOLOGY: At one time regarded as a disease which occurred only rarely, except as a sequel or late complication of lobar pneumonia, we have now to recognize empyema as occurring very often as an early complication and especially so with the streptococcus bronchopneumonia and that following measles. The hemolytic streptococcus has been found to be responsible for most of the epidemic cases, especially where complicating bronchopneu-

*Read before the Southwestern Virginia Medical Society in Christiansburg, May 17, 1923.

monia, while the pneumococcus has been found to be the causative factor in the sporadic cases.

PATHOLOGY: The amount and character of the exudate, as well as the time of occurrence, has been found to vary with the type of organism present. The streptococcus is apt to produce a large fluid exudate in a short time, later tending to become purulent. The influenza type tends to produce only a small amount of fluid and this is purulent from the beginning. On account of the small amount present, it has been found that occasionally it will be absorbed spontaneously, but this of course is the exception rather than the rule. The pneumococcus exudate is purulent at all stages of its development, and large in amount. All of these types of exudate may contain large flakes of fibrin and especially if allowed to remain undrained for any length of time. The pleura having reacted gradually to the infection is in the usual case thickened and resistant; however a serious pathological condition is sometimes found in the presence of an encysted empyema. The rupture of such into an uninfected pleural cavity is a serious accident, it appearing that the sudden contact of so much septic material with the undiseased pleura has much the same effect as it would on the peritoneum. The gross findings in chronic cases have been more clearly outlined by the use of the X-ray, especially in determining the position and extent of cavities and sinuses when injected with some opaque material.

DIAGNOSIS: There has been nothing of great importance added to the knowledge concerning the general principles of diagnosis of empyema as carried out by careful history and observation of symptoms and a thorough physical examination. The laboratory methods of diagnosis however have been more fully developed and under the heading two main features are to be considered.

First: Bacteriologic examination of the discharges should be carried out both in diagnosis and treatment, this being important in that it helps not only in the planning of how and when to operate, but also as a control during the treatment with antiseptic solution and as a guide toward when closure should be permitted to take place or plastic operation attempted.

Second: An X-ray plate and fluoroscopic examination, while not absolutely necessary, is a valuable aid in diagnosis. However, after the cavity is drained, and especially if air is

allowed to enter, it is difficult to interpret the findings, because of the great variations in density of the chest contents. In the investigation of chronic cavities in order to determine position and extent, the best method of outlining the cavity has been found to be by injecting with 20% bismuth and 3% acacia in cottonseed oil. This procedure was also successfully employed by Stevens as a guide in determining the extent of expansion of the lung in empyema cavities of long duration.

TREATMENT: Up to the period of the outbreak of the war, the established method of treating empyema as soon as discovered was immediate thoracotomy, with or without rib resection, and usually no irrigation was instituted for several days, if at all, later on exercises to encourage lung expansion were instituted and suction apparatus was used by some, but the results were not generally satisfactory. The tremendous mortality of empyema among the soldiers at Camp Lee at the outbreak of the war was investigated by a specially appointed commission who found the streptococcus to be the etiologic factor, complicating streptococcus pneumonia. They found that early operation had been performed in most cases, and with fatal results in many; so that a policy of deferred operation was adopted whereby repeated aspiration was performed on the acutely ill cases in order to relieve the pressure symptoms until the pneumonic process had subsided. At this time the usual thoracotomy was performed and Dakin's fluid irrigations established. The preliminary treatment by aspiration has even resulted in a recovery without operation in several cases. However, in none of these has there been formation of real pus. The adoption of this policy and method resulted in very gratifying results.

The Thiersh method of treatment has been revived with modifications. This method was devised to prevent collapse of the lung by pneumothorax and consisted in passing a large caliber rubber catheter into the pus cavity by means of a trocar and attaching a flexible rubber tube to the end of the catheter so that the walls of the tube would collapse on inspiration and prevent the entrance of air, at the same time allowing free drainage. A modification of this method is the closed method of Mozingo, whereby Dakin's fluid is instilled and withdrawn through the tube at such intervals as are deemed necessary to sterilize the cavity and

remove the pus. This method is applicable in many cases and has several advantages, such as simplicity, avoidance of shock and prevention of sacrifice of tissue. It is agreed by a great many that Dakin's fluid irrigations are practical and safe, provided first an injection of physiologic saline is used in order to determine the presence of an opening into a bronchus in which case the injection of Dakin's fluid would be followed by unpleasant results due to irritation. The method is naturally adapted to cases in which the pus is in a fluid state and the presence of fibrinous masses would be a serious objection to its use and indication for a wide opening in order to permit their escape. With the antiseptic irrigation treatment properly carried out, it is probable that the formaldehyde and glycerine injections would not be necessary and, in addition, there is a tendency toward pleural thickening with such treatment. The technical nature of this procedure might prove to be a drawback in some cases where the operator was not practiced in the technique. As an emergency procedure, therefore, simple aspiration with a large caliber needle would be sufficient to relieve the condition until a better method of treatment could be carried out. There has been some criticism of the use of Dakin's fluid on the ground that it is too irritating to be used in the pleural cavity. Notwithstanding the fact that Dakin's fluid is not absolutely essential in the treatment, it appears that it has shortened convalescence in many cases.

This method while apparently mechanically perfect is not without the disadvantage that after four or five days there is a tendency toward retraction of the skin around the tube and consequent leakage of pus. If this did occur however, one would still have the choice of a resection and drainage, and probably by that time the patient would have passed over the critical period and other changes have taken place within the pleural cavity which would render thoracotomy a safer procedure than if it had been undertaken in the first place. A modification whereby the entrance of the tube could be made air-tight has been devised, and is made effective by means of circular cap of rubber made air-tight around the tube and to the skin by means of Sinclair's glue. In cases where there is no tendency for the lung to expand under the closed method of treatment, it is an indication that a dense fibrous layer is

forming upon the surface of the lung with resulting compression. In such a condition, provided the acute stage of the disease has passed, prompt operation is indicated with the freest possible drainage and irrigation in addition. The choice of operative procedure, whether by the conservative method in which drainage and irrigation are carried out through a tube passed through an air-tight opening in the chest wall, or the more established method of rib resection, must be governed by individual needs of the case. An aid in the formation of this decision is character of the organism. It has been observed that streptococcus empyema occurs early with pneumonia, while the pneumococcus follows the lung process later. The character of the pus in the streptococcus type is usually thin enough to be aspirated or withdrawn through a tube, while in the pneumococcus type it is usually thick, contains fibrous masses and can only be effectually evacuated through a large opening. There have been great advances in the treatment of chronic empyema and in the hands of Keller of the Army Medical Corps a new method of procedure has been adopted whereby with the use of Dakin's fluid for obtaining asepsis, and a policy of dividing the operative procedure into a number of brief stages, he has been able to obtain remarkable results in a great number of apparently hopeless cases.

As regards treatment, in conclusion let it be said that, as far as the anaesthetic is concerned, the use of a general anaesthetic has been found not necessary with properly induced local anesthesia and some have gone so far as to say that it is criminal to employ general anesthesia.

PROGNOSIS: Expansile power of the lung and especially activity and tone of the diaphragm are rapidly restored following removal of septic material and irrigation with Dakin's fluid or salt solution. Failure of expansion of the lung has been found more often to be due to the surface being covered with septic material due to which the physiologic activity of both the lung and the diaphragm are retarded, and in the presence of this failure to expand, caution should be exercised in the closure of the external wound lest pus pockets, sinuses, and cavities be found later to exist. The outlook for recovery has been improved and the number of chronic cases lessened as methods have been adopted more to suit the needs of the in-

dividual case. A certain number of cases have resulted fatally, but only in the face of overwhelming complications, where the treatment has been carried out properly. The causes of chronicity have been made more plain by recent methods of study, rendering direct attack upon the underlying causes more effective.

CONCLUSION

First: Extensive operation, as by rib resection, should not be performed as long as there is a pneumonic process in existence.

Second: Remove pus during the acute stage duly by aspiration or air-tight tube drainage, especially if respiration is mechanically embarrassed by the accumulation of a large amount of fluid.

Third: Operate as soon as the pneumonic process or acute stage has subsided, by rib resection and wide drainage or tube drainage with free irrigation.

Fourth: The early and continued use of irrigating solution, both normal saline, and Dakin's fluid, for both their mechanical and bactericidal actions is indicated.

Fifth: Chronic empyema is more rare than formerly and the outlook when it does occur has been made more favorable by the use of Dakin's fluid and a specially developed operative procedure.

RENAL TUBERCULOSIS.*

By W. O. POINDEXTER, M. D., Newport News, Va.
Urologist to Elizabeth Buxton Hospital.

Tuberculosis of the kidney constitutes one of the important chapters of surgery and certainly one of extreme importance to the urologist, since 25% or 30% of all the surgical lesions of the kidney are tuberculous. The statistics of Kronlein and Israel bear this out. Caulk of St. Louis found fifty-five tuberculous kidneys in two hundred and fifty surgical operations upon this organ.

By the introduction, retention and colonization of tubercle bacilli in the kidney many types of morbid processes may develop. The French school classifies miliary tuberculosis, nodular tuberculosis and tuberculous nephritis. It seems satisfactory to classify two main types, (1) acute miliary and (2) chronic or surgical tuberculosis, and in addition we may have (3) a toxic tuberculous nephritis.

Authorities are now pretty generally agreed

that the vast majority of cases of renal tuberculosis represent blood borne infection from some other source in the body, such as lung, bone, gland, bowel, or joints, which first attacks the kidney and then the ureter or bladder secondarily. Primary infection of the urinary bladder through the urethra is an exceedingly rare occurrence. Kuster states that 10% of patients dying of tuberculosis have renal involvement.

The question of ascending renal infection along the ureter from a bladder focus has long been a favorite topic of energetic controversy between both clinical and experimental observers of large experience. Most observers, however, hold that while this is a theoretical possibility which now and then may materialize, it is certainly exceptional and most of the reported cases admit of more rational interpretation on the assumption of independent and repeated haematogenous infection. The masterful work of George Walker showed that ascending infection up the unobstructed ureter did not occur. Bauerism states that with the flow of urine unobstructed, tubercle bacilli cannot reach the kidney intra-ureterally. Infection along the ureteral lymphatics, both in tuberculosis and non-tuberculosis, has certain advocates. Most authors concur in the belief that the usual path of infection is through the blood stream, and there is abundant evidence to warrant the conclusion that this is the most universal manner of renal infection. With a small tuberculous involvement within the body, there are frequently temporary bacillemiæ. It is therefore easy to appreciate how a kidney, constantly filtering organisms, could under certain conditions become infected.

As to the exact location of the initial lesion within the kidney, there is dispute. Cabot and Crabtree, in their work, seem to believe that experimentally the earlier lesion is at the base of the pyramid between the cortex and is more common in the tubular region. In the massive or ulcerative type the organ becomes converted into multiple cavities, which may communicate with the pelvis, are separated from one another by septa of disintegrating renal or fibrous tissue and filled with necrotic material. This may go on to complete destruction of the parenchyma. If the ureter becomes permanently obstructed before the secretory portions of the kidney have been fully destroyed, tuberculous pyonephrosis results.

Then the organ again may be studded with

*Read at the meeting of the Walter Reed Medical Society at Smithfield, Va., in the fall of 1922.

numerous firm grayish-white nodules varying in size from one to three or four millimeters in diameter which show little or no tendency to ulcerate.

Total obliteration of the ureter is produced by superficial ulcers which destroy the mucosa and submucosa, leaving intact the muscle wall, the occlusion being affected through regenerative changes with scar tissue formation.

Now, then, what should lead us to suspect the existence of this disease and how are we to establish the diagnosis? Fortunately, there is rarely any great difficulty if we are careful to obtain a complete, accurate history, and then resort to the various methods of examination now at our command.

The disease is preeminently one of young adult life and is by far the most frequent of all purulent renal affections of this period. Not only is it unilateral at the outset in over 90% of cases, but the relative infrequent and extraordinary late involvement of the second kidney is a striking characteristic which has a most important bearing upon the treatment. The disease may long remain symptomless and be first observed through a mixed infection. On the other hand, while still confined to one kidney and in the early stages, it may give rise to any one or all of a characteristic group of symptoms which should lead to its prompt detection.

These may be conveniently divided into (a) local and (b) constitutional symptoms. CONSTITUTIONAL SYMPTOMS may be summed up as follows: Irregular fever, night sweats and lastly emaciation.

LOCAL SYMPTOMS:

Frequent and painful urination, present both night and day. The pain is referred along the course of the ureter and to the neck of the bladder, coming, as a rule, at the end of urination.

Haematuria. Intermittent haemeturia without obvious cause should always be suggestive of renal tuberculosis, as this may be the first symptom. The bleeding is continuous for days or weeks at a time, differing from haematuria associated with calculus, and total instead of terminal which usually signifies some bladder lesion.

Pyuria. Pus is present at some time in all cases, the urine is pale, low specific gravity and usually acid, but may become alkaline through a mixed infection. The pain in renal tuberculosis is dull and aching in character and may radiate along the course of the ureter. It

may be colicky in type and very severe when the ureter may become blocked by a blood clot or caseous material thrown off from a disintegrating kidney.

Tubercle bacilli can usually be demonstrated in the urine if persistent and repeated search is made from the twenty-four hour specimens. Crabtree claims they can be found in practically all cases if the urine is allowed to stand for a while and, after pouring off the supernatant fluid, the sediment be centrifuged by high power for one to two hours. But we must not forget that it is possible for tubercule bacilli to be excreted in the urine by a healthy kidney which is not tubercular. If we fail to find the bacilli in the urine we must then resort to animal inoculation; the disadvantage of this test is the time required.

When the disease invades the bladder, we have the symptoms of cystitis. There is frequent, urgent urination night and day, associated with great pain both during and at the end of urination. The viscus becomes extremely intolerant and irritable and robs the patient of all restful sleep. Emptying the bladder affords little or no relief and, as the disease advances, marked strangury and tenesmus dominate the symptom-complex.

Cystoscopy is an invaluable aid in enabling us to determine accurately certain points: first, to make a positive diagnosis; second, to determine the location, extent of renal involvement, and third, to investigate the functional activity of one or both kidneys.

In advanced cases the bladder is so intolerant of instrumentation that an anesthetic may have to be given; spinal or sacral usually suffices. In the early stage we usually find the ulcerations of the bladder, which are either discrete or grouped around the ureteral orifice or trigone as minute, slightly elevated, greyish-yellow nodules, surrounded by a zone of hyperemia. This tendency to localize around the ureteral orifice or trigone is of diagnostic value.

If the case is examined when the disease is still confined to the region of one ureteral orifice, pictures are seen which may be considered practically diagnostic. Thus ulceration confined to this region indicates that the kidney of that side is almost surely diseased. A puffy red ureteral orifice in an otherwise healthy looking bladder is very suggestive. So also is the retracted crater-like ostium. Then again the orifice may be enclosed in a circle of little vesicles or the so-called bullous-edema, which

is almost pathognomonic of descending renal tuberculosis. Catheterization of the ureter with a comparative study of the urine collected from both sides, by volumetric, bacteriologic, chemical and microscopic methods, is of the greatest help in establishing the diagnosis, revealing the extent of the disease and the competency of the non-infected kidney. So, too, we can observe directly the exact time of appearance in the urine of indigo-carmin or phthalein that has been given hypodermically. We may also by injecting some opaque substance into the kidney pelvis, such as 25% sodium bromide (which is the least irritating of all), determine the amount of dilatation, and the outline of the calyces.

TO SUMMARIZE: We should take a careful history; make a general physical examination to disclose a primary focus elsewhere in the body; measure the bladder capacity which is greatly reduced; note a contracted, irritable viscus intolerant of instrumentation, a cystitis resisting or even aggravated by treatment especially the silver salts, and the persistent acid pyuria from which no organisms grow on ordinary media, associated with the other urinary findings already given. We should also note the cystoscopic findings, and the impaired kidney function with the radiographic disclosures, and finally the use of tuberculin in proper selected cases. If after exhausting all these measures the surgeon is still uncertain, it is a perfectly legitimate procedure to investigate it directly through an exploratory lumbar incision.

TREATMENT: The most important feature in the surgical outlook of the tuberculous subject is the finding of a unilateral tuberculous kidney and finding it early before the late results have become manifest. Some authors advise the removal of the most diseased organ in bilateral tuberculosis but others believe this to have very little effect on the other organ. In bilateral tuberculosis surgical efforts do little, except for renal drainage, to protect a seriously bothered bladder.

The length of operation is very important, especially in regard to the anesthetic. Careful dealing with the perirenal fat is very important, since it has been definitely shown that many of the persistent tuberculous sinuses are due to infection in the remaining fat. As far as possible the fat should be removed. Treatment of the ureter varies with the different cases. Many amputate low down as possible

and do not drain. It is useless to try to remove the entire ureter as the most important part has to be left, that is the intramural part, and most authors feel that such removal is unnecessary. The bladder lesions usually heal after the removal of the tuberculous kidney, the time being in proportion to the severity of the infection.

Tuberculin after operation is claimed by some to be of much benefit, as it seems to hasten the healing of the wound and the amelioration of the bladder symptom. For the painful bladder, I know of nothing better than mercurochrome. Such patients are all put in the sunlight and under the usual tuberculous hygiene.

138 *Twenty-sixth Street.*

BACILLUS ACIDOPHILUS AS A THERAPEUTIC AGENT.*

By GEORGE F. REDDISH, Ph. D., Richmond Va.
Associate Professor of Bacteriology, Medical College of Virginia.

At the last annual meeting of the American Association for the Advancement of Science (December, 1922), Dr. A. B. Macallum, of McGill University, chairman of the section of Physiology and Experimental Medicine, took as subject for his address "The Urgency of Research on the Great Portal to Disease in the Body, the Intestinal Mucosa."¹ This is by no means a new idea to most physicians and bacteriologists alike, but Dr. Macallum is so positive in his claims that this channel is of first importance in the introduction of many diseases, that it seems worthy of serious consideration. He first calls attention to the fact that the intestinal mucosa when functioning properly is capable of warding off the poisons elaborated in the intestines as a result of putrefaction caused by certain of the intestinal bacteria; because of this selective action, it is capable of protecting the body from these harmful products. After being continually subjected to the action of such poisons, however, these cells gradually lose the property of functioning in this way, and then some or all of these products pass into circulation, giving rise to many and varied complications. Dr. Macallum¹ states further:

"It is not too much to say that in this failure on the part of the epithelial cells an explanation may be found of the origin of a large number of diseases of the body. It is my firm conviction that arteriosclerosis, hepatic cir-

*Read before the Richmond Academy of Medicine and Surgery, February 23, 1923.

rhosis, acute yellow atrophy of the liver, nephritis in some of its forms, angina pectoris, senile dementia and dementia precox are all due to failure, more or less pronounced, on the part of the intestinal epithelial cell to play its normal part. In some cases this failure may develop suddenly as in acute yellow atrophy, in other cases it may involve a gradually lessened capacity of the epithelial cell to reject or neutralize the products of putrefactive action. That dementia precox has this origin is indicated by the facts that it is frequently associated with intestinal stasis more or less pronounced and that not infrequently in this disease there may be atrophy of the testes or ovaries, facts that can only be explained by supposing that not only this atrophy but the degeneration of the cortex are due to the action of toxins of intestinal origin. Senile dementia, when not of arteriosclerotic origin primarily, is probably due to a gradually lessened capacity of the intestinal cells to reject the toxic products of putrefactive fermentation."

"The intestinal mucosa must then be regarded as the great portal to disease of the body. This portal may be completely closed as it is in the normal healthy condition of the mucosa or it may be gradually or suddenly pushed open and disease, chronic or acute, may result. If this portal could be kept closed always old age might be indefinitely postponed and bodily vigor maintained for a much longer period than it is now. There is no reason to suppose that the heart, the skeletal muscles, the liver, the kidneys, the nervous system and the endocrinous organs cannot function indefinitely if they are not subject to toxic action and in their normal condition they must be much less subject, through any other portal, to bacterial infections than they are when their condition is altered by the access of toxic material absorbed from the intestinal cavity. The complete closure of the great portal permanently maintained would greatly lessen the incidence of disease and increase the average length of life."

"It is probable that excess in diet, especially in its protein constituents, may task the capacities of the epithelial cells and diminish their power to react normally, with the result that they allow to pass through them, and to the underlying tissues and the circulation, the products of intestinal putrefaction which in

their healthy vigorous condition they do not permit to enter them. This would explain some of the pathological results of a high protein diet. It is also very probable that the primary and most important action of vitamins in diet is on the epithelial cells which, with the glandular structures below them, as McCarrison has found in his observations on animals fed on autoclaved food, undergo marked atrophic and necrotic changes, followed by an extensive invasion of the mucosa by bacteria. The changes which other organs show in avitaminosis have yet to be shown due directly and not indirectly to their deprivation of the vitamins. Once the Great Portal is thrown wide open, neuritis, degenerative changes in the pancreas, thyroid and spleen, atrophy of the testes and ovary, and hypertrophy of the pituitary and adrenals may be of toxæmic origin. Constipation also seems to be one of the earliest results of avitaminosis and its causation may be similarly explained."

That toxins of intestinal origin are a factor in many of the diseases mentioned above, as well as other less definite complications, is well-known to the medical profession. As a factor in promoting health and in prolonging life, the condition of the intestinal canal must be given primary consideration. Just what condition in the intestines is most favorable for normal life, for good health and for a possible long life? The tendency at the present time among bacteriologists and physicians is to consider a simple bacterial flora in the intestines as one of the most important factors to be included. Granting that there may be other factors of equal importance which may be developed later on, some recognition must be given to the very conclusive data already at hand to support the claims for a simplified flora as an aid to this end.

As already indicated, the intestinal bacteria which cause putrefaction are the real cause of the above diseases which result from absorption of toxins through the intestinal mucosa. The first object, therefore, would be to eliminate the cause of the poisons which were being elaborated. The use of intestinal antiseptics is not recognized as efficient for this purpose, and the value of their use has even been definitely discounted through careful experimental work. Fantus² has shown that calomel does not exert a germicidal effect on the intestinal bacteria when administered in the usually

prescribed dosage. It was also found by Dragstedt, Dragstedt and Nisbet³ that the usual antiseptics employed for hand sterilization would not destroy bacteria when placed directly within a section of the intestines of dogs. It was found that dogs died from toxemia of bacterial origin from closed segments even when these strong antiseptics were added and held for certain lengths of time. It seems, then, that other agents besides intestinal antiseptics should be resorted to in checking the activities of these harmful bacteria.

Within recent years, results of research on changes in intestinal flora due to diet have shown that the flora can be materially changed if the proper diet be consumed. It has been shown by Rettger⁴ and his colleagues, at Yale, Torrey⁵ and others, that a high carbohydrate diet will yield a change in bacterial flora from one consisting largely of putrefiers and gas formers, to one composed almost entirely of aciduric types. Such a change can be brought about readily by the administration of large amounts of milk sugar. Rettger has shown that a similar result can be secured by the ingestion of young milk culture of *B. acidophilus* even more readily than by means of high carbohydrate diet. At present, the latter method is decidedly more popular than the former, not only because of the better results obtained, but also because of the more palatable taste of the latter and more agreeable effects. Broth culture has been used by Gompertz and Vorhaus⁶ with very good results. So far, experience has shown that *B. acidophilus* is more viable and lives longer in milk than in broth culture, and decidedly better than in such commercial products as are being put upon the market in various forms. The activity in the commercial field is indicative of recognized merits of the principle, but unfortunately most of the products are of questionable value. Those commercial products which have lactose or dextrin as their principal constituent are of value, but the price charged is somewhat out of proportion to the cost of the constituents. The number of reliable concerns which are interested in this matter is indicative of a deep interest in this therapeutic agent.

Admitting that it is usually not advisable to go against the laws of nature, and that constipation and a putrefactive flora are normal to

adults, it still is not illogical to attempt to prevent premature old age, and such conditions as arteriosclerosis by producing an infantile condition in the intestines. In fact, this would seem entirely logical, and certainly has been of definite benefit clinically in a large number of cases. At the present time, this measure seems to approximate the ideal suggested by Macallum as a means of preventing degeneration of the intestinal mucosa more nearly than any other at hand. Therefore, it seems that this agent should receive a thorough trial clinically in the hands of the practicing physician and, should it prove to supply the necessary means to bring about the desired result, be accepted into his general practice as a permanent treatment for such types of disorders for which it is suited.

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THE CONTUSED ABDOMEN.

By E. B. CLAYBROOK, M. D., F. A. C. S., Cumberland, Md.

In March 1913, I read a paper before the Eastern Panhandle Medical Society, at Martinsburg, W. Va., the title of which, was "Injuries of the Abdominal Viscera, Without External Evidence of Injury." At that time, I reported eight cases and referred to two others previously reported that had occurred in my practice.

In a paper read before the Southern Medical Association in Asheville, on injuries of the

spleen, I reported four cases of this type. In looking over my records, I find that since these reports I have operated on seventeen other cases of visceral injury without external evidence. These injuries varied from small tears in the mesentery, to large tears in the bowel and liver. There was one case of severe laceration of the kidney.

Therefore, it seems that such injuries are quite common in occurrence and, if I may judge from the few referred cases I have seen, they are very often overlooked. One young man that I saw after three days, had been tussling with a fellow workman, when he was struck in the abdomen by the knee of the other man. He went to a doctor's office and after casual examination was sent home without a diagnosis. One day later he was quite ill and sent for another doctor who treated him two days before calling consultation. The consultant ordered him to the hospital at once, and when he arrived he was operated on immediately. The abdomen was full of fluid and coarse undigested food, from a tear in the jejunum about one inch long. This man died of peritonitis which could and should have been prevented.

The chief thing for us to consider, as industrial surgeons, is that such cases are not rare, and we can not too strongly urge a careful watching, and frequent examinations of any patient that has suffered an injury to the abdomen. The diagnosis in these cases must be made on the history and *early* clinical signs, if the patient is to have a fair show for his life.

The literature gives symptoms that, if waited for, will be followed by death, even if operation is done. Hence, we must re-model our ideas of the clinical picture which presents. Most writers stress rapid pulse, temperature, abdominal facies, absent liver dulness and severe shock among the symptoms. These are symptoms of severe hemorrhage or peritonitis. The patient should be operated on before getting into this condition. The history usually shows that the man has had a blow on the abdomen, has been squeezed through the body, has been run over by a vehicle, or has had a fall upon the abdomen.

I saw two cases, in which the patient fell, striking on the abdomen. One fell off a car, and the other fell over a fence. Both suffered large tears in the bowel. Another man merely

slipped while standing up in a horse cart, striking the front of his abdomen against the front of the body of the cart. He had a tear in the ileum two inches long. The violence is often seemingly slight and hardly worth considering.

The SYMPTOMS must be considered from the standpoint of those that may be observed early, because here is a condition in which the diagnosis must be made early in justice to the patient. Consequently, to my mind there are only five symptoms of first importance that should be looked for in these patients. There are a few others which have bearing on the case, and may aid in its interpretation. I will take these up in the order of their importance.

(1) *Transmission of heart and respiratory sounds*, so that they may be heard all over the abdomen. This sign may be absent in severe injury and may be present with a fairly slight amount of trauma in the abdomen, with a small hemorrhage. If it is present and well marked, there is always accompanying injury: and it of itself is a strong indication for exploring the abdomen.

(2) *The Silent Abdomen*. The entire absence of peristaltic sounds always means trouble, but we may have very active sounds with severe injury, at times. If the patient has had morphine, this may lessen peristalsis, but will never obliterate all sounds.

(3) *Tenderness*. This of course, may come from muscular contusion but, if marked, localized and elicited by firm rather than light pressure, the inner organs are probably its source; and its location is a fair indication of the point of injury, as a rule.

(4) *Rigidity*. This may be present or absent. If present, it may mean contusion of the abdominal wall, but in that case it is not marked and is not accompanied by the transmission sign, or the silent abdomen. The history will help in the decision.

(5) *Vomiting*. This usually occurs until the stomach is emptied. It is then absent, until peritonitis induces late vomiting. The vomited material is usually ordinary stomach contents, though in some cases, when the contusion is high up and severe, it may contain blood. Usually, when blood is vomited, if a careful examination is made, a concomitant injury of the mouth or pharynx will be demonstrated, the blood having been swallowed.

These five symptoms, to my mind, are the

most important, in arriving at a diagnosis. While pain may be a help, it is rather unreliable, except as taken in consideration with the foregoing.

Dr. S. S. Gale, of Roanoke, Va., suggested that a blood count is of great value. In cases where there is severe internal hemorrhage, we would get a high white, and a low red count. This may at times be of great assistance, but many of the cases of bowel rupture show practically no hemorrhage at all. It is possible to have quite a dangerous injury with no blood reaction, until some hours allowed the development of peritonitis, followed by leucocytosis.

The bladder in all cases should be catheterized to exclude rupture or a tear in the urethra.

THE DIAGNOSIS. This must be made early and we must arrive at our decision through a consideration of those symptoms that arise early. We must remember that the early symptoms, whatever the injury, are due solely to the irritation of the peritoneum by fluid contents of a hollow organ, or the outpouring of blood into the free cavity.

First the history. Did he get a fall? Was he squeezed in a close place? Did he have a blow on the abdomen, or was he run over by a vehicle? Did he vomit; if so, how often and how soon after the injury? What was the nature of the vomitus?

This, followed by a careful auscultation and palpation of the abdomen, will give us as good an insight into the case as we can get.

If he has either the silent abdomen, or the transmission sign with rigidity, or tenderness, and the history is such, as to lead to a strong suspicion of visceral injury, then I feel that it is right to make a tentative diagnosis of visceral injury: and exploration should be done.

If there is strong doubt as to visceral injury, then the man should be placed in a hospital under careful watching. He should be seen by the doctor hourly, until he feels assured that there is no injury to the organs.

I do not mean to advocate promiscuous opening of the abdomen; but I do feel that too many men are allowed to die annually, while the attendant is waiting the development of symptoms which will assure the diagnosis. When conditions justify an assured diagnosis, it is often too late to operate, and the dire

prediction so often seen in the newspapers, "Mr. Jones, injured internally, will die," is promptly fulfilled.

I have opened two men that showed no special injury (except small bleeding) that would have caused any serious trouble if left alone. I feel that no injustice was done these men. They had other injuries that complicated the findings.

In operating on these patients, one must be prepared to do anything, from plain packing, or ligation of a bleeding point, to a re-section of the bowel, or nephrectomy. I feel that we can never be more explicit in our diagnosis, than that some internal organ is injured.

Riverside Building.

TRACHEOTOMY; IMPROVED TECHNIQUE.

By ELBYRNE G. GILL, M. D., Roanoke, Virginia.

There are times when all laryngologists are called upon to perform a tracheotomy in cases when intubation will not answer:

- (1) When intubation tubes are not available or their use is not understood.
- (2) In excessive edema of the larynx when the intubation tube does not relieve.
- (3) When the membrane is in the lower tracheal track.

The accidents which may be incident to this operation are:

- (a) Failure to open the trachea, especially in very fat children.
- (b) Severe hemorrhage when the incision is carried too far to either side.
- (c) Irregular incision making it difficult to introduce cannula.
- (d) Asphyxiation from blood escaping into the trachea.
- (e) Asphyxiation from collapse of the trachea.

(f) Septic pneumonia or lung abscess caused by the escape of blood and infected material into the trachea and bronchi.

The above complications can be avoided, also the haste in performing the operation can be obviated, by employing the following technique:

1st. Before performing the operation, introduce the bronchoscope and allow it to remain in the trachea and bronchus until the operation has been completed.

All that is necessary in employing this technique is to be equipped with one broncho-

scope, one laryngoscope and a pocket battery, with its connections. A competent laryngologist should be able to expose the larynx and introduce the bronchoscope in one minute's time.

When the bronchoscope is once introduced, there will be no need for undue haste in performing the tracheotomy as the patient will have been provided ample breathing space and the operator will have a firm land mark to follow in cutting down on the tracheal rings. After the incision has been made through the tracheal rings and all bleeding controlled, the operator can then remove the bronchoscope to the point of the incision and then introduce the tracheal cannula and this completes the operation.

The incision should be made low, following the method described by Jackson. If this is done, a tracheotomy will be performed and not a laryngotomy.

As far as the writer has been able to learn this technique is not being employed and has not been mentioned in any recent text book on laryngology.

612 MacBain Building.

THE IMPORTANCE OF THE GLANDULAR SYSTEM AND A PLEA FOR THE PRESERVATION OF THE TONSILS.*

By J. E. COPELAND, M. D., Round Hill, Va.

The glands of the human body perform an important part in its economy, but the functions of the great majority of its six hundred glands is shrouded in mystery and a knowledge of their physiological actions is often discovered only by the effect of some pathological condition of their structure. The functions of the glands afford a wide field for the physiologist and clinician and the most imaginative theorist has scarcely dreamed of their agencies in the development of the human body and the importance of their maintenance of it in health. While glandular therapy has received considerable attention, many discoveries have, unfortunately, been utilized by drug mongers who exploit their products for profit. Nevertheless, there is efficacy in a number of glandular preparations, if properly administered.

Recently we read that an eminent investigator claims that a criminal tendency is

caused by diseased glands. We are all familiar with the fact that, in certain diseased conditions of the glands, other remote glands of the body with which no anatomical connection can be, or at least, never has been demonstrated, are seriously affected. For instance, parotitis when confined to its original habitat, the parotid gland, is more or less mild and, so far as is known, a harmless disease, but when in its course a metastasis supervenes, which is not an infrequent occurrence, grave and irreparable injury to the procreative organs of the male results and in this event the testes become involved, epididimitis occurs, the spermatic cord is obliterated, or at least its function is impaired, and sterility results. In females a metastasis affects the mammary glands and, if the subject be a nursing woman, the milk dries up and the glands cease to function. Normally, the thymus gland atrophies at puberty, but if from faulty metabolism it retains its original size or increase in bulk, we find enlarged bones, muscles of the face, hands and other parts of the body, which condition is known as acromegalia. Just here we can not refrain from a digression to remark that the phrase "faulty metabolism" is a very valuable acquisition to the vocabulary of the physician and that we should thank the inventor for its coinage and that he claims no patent right on its use, as it serves to conceal our ignorance and often satisfies our patient's curiosity. If the thyroid gland atrophy, myxœdema with its attendant tremors, œdema, leucosis and, in the female, suppression of the menses, results. On the contrary, if the thyroid gland enlarge, we have exophthalmic goitre, protrusion of the eye balls and tachycardia with all their attendant evils. In Hodgkin's disease, we have hypertrophy of the lymphatic glands of the body due to the growth in them of adenoid tissue, which, if the patient survive a sufficient time, extends to other glands, notably the liver, spleen and kidneys, accompanied by anaemia, emaciation and death. If the suprarenal glands atrophy, we have Addison's disease with its bronzed skin, weakness and death. The eminent physiologist, Brown-Sequard, who was a Professor in the Medical College of Virginia, first demonstrated that by irritating the diminutive pituitary gland with "a bare bodkin," produced polyuria. In addition to the above, we might adduce more examples, but these should suffice to invite attention to the im-

*Read before The Loudoun County, Virginia, Medical Society, November 7, 1922.

portant and, in many cases, the indispensable part that the glands exercise in the growth and health of human beings and also of the lower animals.

In February and March 1880, an endemic of follicular pharyngitis in many cases of which the tonsils were involved prevailed over a radius of five or six or more miles that included Rectortown (at which place I was at that time located) and Delaplane and a portion of the Cobbler Mountain in Fauquier County, Virginia. The following summer a young doctor located at Delaplane and, like most young doctors, he had a poorly equipped armamentarium, but was the proud possessor of a tonsillotome which he used indiscriminately on numbers of persons whose tonsils were enlarged from the endemic of the previous winter. I advised my patients against the operation. Previous to the endemic I read in *The Hospital Gazette* a lecture by an eminent professor in New York, on follicular pharyngitis and tonsillitis, in which he condemned tonsillotomy as rendering the patient sterile. I have ever since that time (nigh unto one-half of a century) watched the effects of tonsillotomy and can give many instances that have come within my cognizance, of this result of the operation. I need not particularize but will mention one instance that will serve as an example. Several men were present in a store at Oak Hill within the bounds of this endemic. One of them remarked that a son of a neighbor had tonsillitis. Another remarked that he should have his tonsils cut out and asked my opinion of the operation. I hesitated but finally replied in plain language that it would render him incompetent to fulfil the Scriptural injunction to "Be fruitful and multiply and replenish the earth." My assertion caused some confusion which I ascertained was occasioned by the fact that three of the men who were present had had their tonsils removed, had subsequently married and, after a lapse of several years, their wives had not become pregnant. Similar cases were mentioned by others who were present. Of course, as in the case of the ovaries, if a portion of the tonsil be left intact it may continue to function. The fact that after the menopause is established the tonsils atrophy and no remains of the tonsil can be recognized proves that there exists some connection between the function of menstruation and the tonsils.

Tonsillitis is evidently connected with a rheumatic diathesis which develops during the gormandizing period of childhood and youth and later, from similar or other causes, manifests itself in rheumatism or gout. The treatment of the one is applicable to the other. Give salicylate of sodium and colchicum. In young girls tonsillitis is often complicated with some menstrual disturbance. In these cases give guaiacum.

On October 6, 1922, Charles E. Page, M. D., Boston, Mass., writes that "Dr. John N. Mackenzie, a distinguished physician, a throat specialist and professor in Johns Hopkins University, in an address declared that the operation on the tonsils is 'a surgical insanity' and gave his reasons in detail, the chief point being that the tonsils are very important and useful organs and that there is no more occasion for the removal of an inflamed tonsil than an inflamed eye."

Tonsillitis is an affection peculiar to childhood and adolescence and frequently to newly married people and generally in time vanishes, as it were, of its own volition. If, however, pus supervene and enlargement persist, lance and drain it as you would an abscess of any other part of the body, but leave intact as much as possible of the stroma on which depends the secretion and function of the glands and which is undoubtedly connected with the procreation of the species. I am aware that this assertion is contrary to the opinion and practice of physicians generally, but let them watch the effects of tonsillotomy and they will or should cease to emasculate the innocent, helpless and confiding children and will teach parents the steriizing result of this deleterious practice.

Railroads grant reduced rates to our meeting in Roanoke. It is necessary that each member secure from the office of the State Society a certificate establishing his membership. This privilege will not be granted again unless our members generally use it.

Proceedings of Societies

The Nelson County Medical Society,

At its regular meeting in July, elected Dr. H. G. Dickie, Massies Mill, president for the ensuing year, and re-elected Dr. J. F. Thaxton, Tye River, secretary-treasurer. Dr. J. B. Woodson, Lowesville, was elected delegate to the Roanoke meeting of the Medical Society of Virginia, and Dr. D. C. Wills, Arrington, was elected alternate.

The Society held a special meeting August 13th. for the discussion of the Schick test and the administration of toxin-antitoxin in the prevention of diphtheria. Dr. George Payne, of the State Board of Health, was present at this meeting and gave a demonstration of the test and also administered the toxin-antitoxin to several of the Lovingsston school children. Dr. Payne was also present at another meeting August 20th, at which time the results of the Schick test were observed.

The Society will meet again the fourth Monday in September.

J. F. THAXTON, *Secretary*.

Secretary's Announcement.

Reduced Railroad Rates to the Meeting in Roanoke.

As a result of much hard work on the part of Dr. J. Beverly DeShazo, of Ridgeway, Virginia, the railroads have granted reduced rates on the certificate plan for our meeting in Roanoke. Members may secure from the office of the Society a certificate which on presentation to ticket agents will enable them to purchase round trip tickets for themselves and dependent members of their families at one and one-half regular fares. Last year we did not comply with the requirements of the companies as to the number using the certificates. *It is essential that every member who attends get one of the certificates. A postal request is all that is necessary. We are so anxious to get them to the members that we pay the postage and provide the envelopes. If you find later that you are not going, possession of the certificate will do you no harm. If we do not get 250 members to use the certificates this year the*

privilege will be withdrawn and in the future our members will invariably pay full fare. One certificate is all that is necessary for a member and any number of dependents who may accompany him.

The U. S. Civil Service Commission,

Washington, D. C., announces that applications will be received until December 28 for Junior Medical Officer, to fill vacancies in the Indian Service. Competitors will not be required to report for examination, but will be rated on their education, training, and experience. Full information and application blanks may be secured from the above named Commission.

Book Announcements

Practical Dietetics. With Reference to Diet in Health and Disease. By ALIDA FRANCES PATTEE, Graduate, Department of Household Arts, State Normal School, Framingham, Mass. Former Instructor in Dietetics, Bellevue Training School for Nurses, Bellevue Hospital, New York, etc. Fourteenth Edition. Completely Revised. A. F. Pattee, Publisher. Mount Vernon, New York. 1923. 12mo. Cloth. 687 pages. Price \$2.60 net, postpaid ("Teacher's Dietetic Guide," covering State Board Requirements and Examination Questions in Dietetics given gratis with each copy of Practical Dietetics"). With Pattee's Hand Bag Diet Book, \$3.20 postpaid.

Healthy Life. A Contribution to the Growing Boy Problem, by EDWIN M. HIRSCH, M. D., Clinical Instructor, Loyola University Medical School. With a foreword by BERNARD C. ROLOFF, Supt. Ill. Social Hygiene League. Introduction by LEE ALEXANDER STONE, M. D. The Solar Press, 209 South State Street, Chicago, Ill. 1923. Paper. 24 pages. Pamphlet on social hygiene, for boys and young men from 14 to 20. Price, 25c per copy. Liberal reduction in lots.

Practical Medicine Series. Comprising Eight Volumes on the Year's Progress in Medicine and Surgery. Under general editorial charge of CHARLES L. MIX, A. M., M. D. Volume 1. **General Medicine.** Edited by GEORGE H. WEAVER, M. D., LAWRASON BROWN, M. D., ROBERT B. PREBLE, A. M., M. D., BERTRAM W. SIPPY, M. D., and RALPH C. BROWN, B. S., M. D. Series 1923. Chicago. The Year Book Publishers, 304 South Dearborn Street. 12mo. 678 pages. Cloth.

A Clinical Guide to Bedside Examination. By DR. H. ELIAS, Dozent and Assistant at the First Medical Clinic of University of Vienna, Austria, etc. Arranged and translated by WM. A. BRAMS, M. D., Chicago, Ill. Adjunct in Medicine, Michael Reese Hospital, etc. New York. Rebman Company. 12mo. 135 pages. Cloth. Price \$1.50.

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Editorial

Insulin in Juvenile Diabetes.

A sick child appeals to every one, the world over. The scientific development of pediatrics within the last score of years has done much to lessen illness and death among the children of civilized countries. Infants now receive a more balanced ration. The infant's food, whether breast-fed or non-breast-fed, is more carefully managed and administered. The protection of milk from bacterial changes, the proper modification and balancing of infant feeding, the hygienic and physical control of the environment and bodies of infants has done a large part in reducing the high incidence of acute illness and mortality among children. Besides, from infancy through juvenile years, greater scientific care is now exercised in feeding, in weighing and measuring, in eliminating sources of infection such as infected tonsils and teeth, in searching for and correcting constitutional diseases such as tuberculosis, and in righting and adjusting physical deformities in the years of growth and development.

All of these accomplishments have heartened and brightened every one as these vast improvements in child growth and child physical culture have been observed during the past decade. But in the midst of the optimistic view of the great advances in this field, one dark spot, juvenile diabetes, has persistently remained. While the progress in and success of the fight against the diseases of infancy and childhood has been won in many diseases, the

ominous disease of diabetes, yet casts its long shadow across the path of childhood, for juvenile diabetes has usually been fatal.

Is insulin to change this? One may read Geyelin's* paper and take hope. The paper is based on the observations made of nine children from two to sixteen years of age. The type of diabetes in each one of his cases was severe. The inherent progress of these cases seemed to be in keeping with the type, being progressively worse. In the nine, and in thirty odd additional cases, there have been no therapeutic failures. In the group of cases forming the basis of the report under review, there was



Fig. 1.
Geyelin's case before insulin.

a definite and continuous gain of weight. The gain in weight in his cases varied, but it was present. The gain was, of course, influenced by (1) length of time patient was under treatment and control, (2) age and original weight and condition of the child, (3) the amount of insulin and amount of food given. The gain of weight in the group ranged from two pounds in three months to twenty-two pounds in seven months. In this connection there was observed a commensurate increase in muscular strength and physical vigor, and also in mental well being. In addition to this, there was

*"The Use of Insulin in Juvenile Diabetes." The Jour. of Metabolic Research. Nov.-Dec. 1922, p. 767.

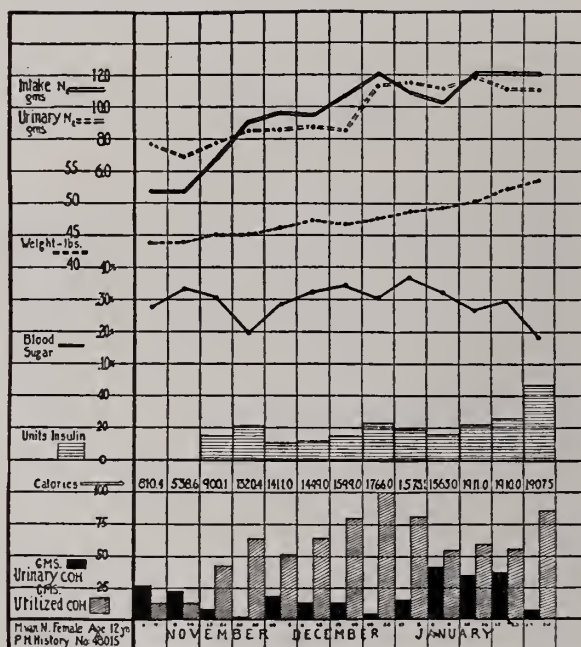
noted a definite increase in the carbohydrate tolerance, varying with severity of the case and amount of insulin given. Insulin treatment and diet adjustment seemed to arrest the downward course of the disease. Let us quote Geyelin, Case VI, for it has an effective lesson to teach:

"Case VI. M. V. N. Age 12 years. Presbyterian Hospital History No. 48015. Date of onset: (1) By symptoms—October 24, 1920. (2) By urine analysis—November 5, 1920. Followed since November 8, 1920.

History and Summary of Pre-Insulin Course: Grandmother a diabetic. Patient was a normal, healthy child, whose best weight at 12 years was 57½ pounds. Onset of diabetes was sudden, two weeks before her admission to the hospital. Polyuria was first noted, two days later polydipsia and polyphagia began. She lost four pounds in two weeks. Glycosuria was discovered, three days before admission, by a local doctor, who put her on a diet high in fat and low in carbohydrate. On the second day of this diet she became drowsy, was nauseated, and vomited. On admission she was drowsy, but could be roused. Cheeks were flushed, lips very red, tongue dry, eyeballs soft, heart rapid, breathing very deep with acetone odor to breath. Examination was otherwise negative. She weighed 53.5 pounds. Her fluids were forced to 3,000 cc. per day. She was given sodium bicarbonate, 26 gm., and put on a diet of carbohydrate, 70 gm., protein, 30 gm., fat, 0 gm. for 3 days. Blood CO₂ rose from 10.9 volumes per cent to 57.6 volumes per cent. Blood sugar remained at 0.380 per cent. There was great clinical improvement. Urinary sugar disappeared after a day on carbohydrate, 30 gm., protein, 10 gm., fat, 0 gm. and one day on carbohydrate, 10 gm., protein, 10 gm., fat 0 gm. After one complete fast day, the diet was gradually raised to carbohydrate 80 gm., protein, 24 gm., fat, 10 gm., before sugar reappeared. She was discharged after one month, sugar-free on carbohydrate, 30 gm., protein, 50 gm., fat, 60 gm.

She was treated in the out-patient department, and was sugar-free for the next eight months, on a diet which was gradually raised to carbohydrate, 50 gm., protein, 65 gm., fat, 110 gm. Her weight rose to 56.5 pounds. Two blood sugars during this period were normal. Toward the end of this time (August 1921), her tolerance began to fall, until, one year af-

ter onset (November 1921), she showed sugar on carbohydrate, 20 gm., protein, 35 gm., fat, 35 gm., and was sugar-free on carbohydrate 10 gm., protein, 25 gm., fat, 25 gm. Acetone was always present in the urine from about this time on. In November 1921, she had a tooth extracted, which proved to have a pus sac at the root, and during the next few months she suffered from frequent colds. In the first six months of her second year she was kept on a gradually decreasing diet with frequent fast days, and was admitted to the hospital in May 1922, showing sugar on carbohydrate, 20 gm., protein, 20 gm., fat, 50 gm. Physical examination was negative, weight 46 pounds, blood



Case VI

sugar 0.298 per cent. On a diet of carbohydrate, 14 gm., protein, 20 gm., fat, 90 gm., her daily urinary glucose averaged 28 gm. Her carbohydrate was cut to 7 gm. with no effect on the glycosuria. She was then put on carbohydrate 0 gm., protein, 20 gm., fat, 20 gm., on which she became practically sugar-free after six days. She was kept on this for 14 days in all, and then remained sugar-free for 5 days on carbohydrate, 5 gm., protein, 20 gm., fat, 30 gm., but began to show sugar on carbohydrate, 5 gm., protein, 30 gm., fat, 35 gm., and continued to show a daily output of 20 to 30 gm. of sugar on carbohydrate, 6 gm., protein, 25 gm., fat, 50 gm. She was discharged on carbohydrate 5 gm., protein, 25 gm., fat, 60

gm., weighing 51.75 pounds, and in the next two months showed only a trace of sugar most of the time though her diet was raised to carbohydrate, 7 gm., protein, 30 gm., fat, 65 gm. It should be noted that her urinary volume during this time was very large.

Third admission October 31, 1922, for insulin therapy. During a control period of two weeks before insulin was started, daily urinary sugar averaged 25.6 gm. on a diet affording 29.15 gm. available carbohydrate, with average daily nitrogen loss of 2.6 gm. This made the utilized carbohydrate 13.6 gm. Blood sugar averaged 0.297 per cent and blood CO_2 48.7 volumes per cent. Weight was constant at 44 pounds. Basal metabolism—38 per cent.



Fig 2
Same case four months after insulin.

Average urinary volume was 5,000 cc. with consequent great loss of heat. Clinical condition was characterized by extreme weakness and lethargy.

Course under Insulin Therapy: Chart shows increase in weight and carbohydrate utilization coincident with insulin therapy. Positive nitrogen balance is attained. The maximum insulin effect is seen at the end of the second month, and is followed by three weeks of relatively delayed progress, with return to negative nitrogen balance. The gain in weight was

uninterrupted and was not accounted for by fluid retention. During this period, on account of shortages in supply, insulin therapy was several times interrupted for a day or two at a time. Over the period covered by the chart gain in height was about 3 cm. Distribution in diet of carbohydrate, protein, and fat in last three weeks of chart was, carbohydrate, 50 gm., protein, 75 gm., fat, 150 gm.

Abscesses at site of injection: None.

Independent infections: January 22, acute pharyngitis and cervical adenitis. January 25, maxillary sinusitis; antrum opened, found to contain pus, and irrigated daily from January 25 to February 9.

Serum sickness: None.

Insulin shock: None."

Allen and Sherrill's* summary and conclusions on Insulin are:

"1. All of the 79 cases of uncomplicated diabetes in this series have responded favorably to treatment with insulin. There has been only one death, due to flagrant disregard of diet. The increases of diet, weight and strength made possible by the new treatment even in the severest cases are beyond comparison with anything possible under any other known method.

2. Of 9 coma patients treated with insulin, 5 died and 4 recovered. All or nearly all of these cases were evidently hopeless with ordinary treatment, and the saving of lives can be directly credited to the insulin. In most of the unsuccessful cases insulin reduced or abolished glycosuria and ketosis, and the reasons for death under these circumstances are still hypothetical. The necessary dosage in coma cases may run into hundreds of units in 24 hours, the possible limits of safety or usefulness being as yet undetermined. All the measures formerly in use, together with somewhat more glucose or carbohydrate than formerly customary, should be used as adjuvants to insulin.

3. Among 14 cases complicated by local or general infections, there have been 5 deaths and 9 survivals. The higher nutritive level made possible by insulin promises to be especially important for cases of diabetes with tuberculosis. For other medical and surgical infections, notably gangrene, insulin is extremely helpful for bringing glycosuria and other symptoms under control more rapidly and thoroughly than otherwise possible while

*Journal of Metabolic Research. Nov.-Dec. 1922.

obviating the necessity of extreme undernutrition. The limited experience seems to indicate that moderate undernutrition is still beneficial to such cases in conjunction with insulin, at least during the period of chief danger. Emphasis should be placed upon thorough control of the diabetes rather than upon high nutrition. The general resistance and the healing of wounds are no better under insulin than they have been under efficient dietary control heretofore. The incidence of respiratory and other minor infections is perhaps slightly higher than under the former strict undernutrition treatment. The lowering of tolerance which has long been familiar under diet treatment is now represented by an increase of the insulin requirement during infections.

4. We have followed the general principle that treatment should keep the urine normal and the blood as nearly normal as possible. It is seldom feasible with the present methods of using insulin to keep the blood sugar as rigidly normal as with diet alone, especially in severe cases, because of the danger of hypoglycemia, but with care this ideal can be rather closely approximated. All our attempts with lax or inaccurate diets in conjunction with insulin treatment have led to disastrous results. Thorough training regarding the use of both diet and insulin should be given, preferably in an institution, to all patients before they attempt the management of their condition away from direct supervision. After such training patients have proved able to continue the treatment successfully at home, and the average standard of fidelity has been higher than before. *Insulin has tremendously improved diabetic treatment, but has not simplified it.*

5. The occurrence, symptoms and treatment of hypoglycemia, as described by the Toronto investigators, have been confirmed. The avoidance of danger from this cause is ordinarily a simple matter both in an institution and for well trained patients in their homes.

6. Our general standards of nutrition have been, for growing children ample diets for their development, and for adults enough to keep them a few pounds below their original or normal weight and to make them comfortable and fit to work. While gross excesses of carbohydrate are avoided, the diets are nevertheless of agreeable mixed character, and

are planned not in conformity with any fixed rule but rather to suit the empirical needs of each individual case in respect to both composition and total caloric value.

7. The insulin dosage necessary for control of symptoms under the above conditions has ranged between the extremes of 4 units and 70 units per day in different cases. The requirements vary with the severity, the total diet, the body weight, and other known and unknown factors. Our dosage also has been individualized to suit each case, as we believe that all rules based on the glucose value of the diet or any other principle yet known are widely fallacious.

8. Exercise seemed to accomplish an increased utilization of sugar in three cases under insulin treatment, as formerly known under diet treatment. The influence in this direction is only slight, and the chief practical importance of the observations lies in the warning that heavy exertion may increase the danger of hypoglycemia in certain cases.

9. Insulin showed no perceptible influence upon non-diabetic conditions such as kidney disease, cirrhosis of the liver, or neurasthenia.

10. In 3 cases, diabetics seemed to lose tolerance demonstrably when glycosuria was permitted with insulin treatment. Several other patients have shown gain of assimilative power with insulin beyond anything that could be expected with diet alone. There seems to be no chance of real cure unless possibly in certain mild or incipient cases, with which the trials are still in progress. On the whole, when allowance is made for accidental or modifying factors, the insulin requirement of most cases remains fairly constant and the patients return to their former condition if insulin is withdrawn. These observations at least encourage the hope that downward progress can be arrested by suitable use of insulin, and they therefore add support to the theory that functional over-strain is the essential cause of the progressiveness of diabetes.

From a practical standpoint, three points seem worthy of emphasis by repetition. *It is feasible for patients at their homes to remain free from glycosuria and nearly free from hyperglycemia under combined treatment by diet and insulin. Over-nutrition makes freedom from glycosuria difficult, and exposes to acidosis, infection and other dangers. Insulin is a literally epoch-making discovery, which revolu-*

tionizes the results of diabetic treatment when properly employed, but it cannot atone for lax or inaccurate dietary methods."

Williams'* Conclusions are:

"1. In the study of any remedy for the treatment of diabetes, the significance of dietary control must be thoroughly evaluated, because with proper regulation diabetics may gain and maintain to a very considerable degree the ability to utilize glucose.

2. It requires from 2 to 4 weeks of careful observation and dieting to determine approximately the maximum diet which will enable a diabetic to maintain a normal blood sugar level and urine free from glucose.

3. If proper dietary control be continued, the diabetic may gain slightly in food tolerance over a period of a year or more or he may decline with more or less rapidity in that time.

4. Because of the foregoing facts, it is difficult to measure with precision the value of insulin in diabetes.

5. A series of 44 cases were studied over periods of time varying from 20 to 250 days. Of these 37 were unusually severe, nine cases being in coma when treatment was begun. The food tolerance of 34 cases had been carefully determined by previous study.

6. Four deaths have occurred. Two of these can be directly attributed to insufficient insulin, and two were from causes unrelated to the diabetes.

7. The 40 living cases have gotten along with far greater comfort and strength than was experienced before the institution of the insulin treatment.

8. The feeding of high diets and attempting to make their utilization possible by large doses of insulin has not been satisfactory.

9. The best treatment, apparently, is a diet which will enable the patient to meet the energy requirements of light work with sufficient insulin to insure the metabolism of the food.

10. Time and frequency of dosage are important. Apparently the action of extract lasts only for a few hours. In severe cases it should be administered at least twice and better three times a day in properly spaced doses.

11. To prevent reactions a higher blood sugar level should be permitted than is customary when extract treatment is not employed.

12. The first effect of insulin apparently is to cause the storage of glucose. Later it may in part be burned. During the night glucose appears to be released from the tissues, leading to a high morning blood sugar and often urinary sugar.

13. Diabetic patients receiving insulin treatment experience a noteworthy gain in strength and well-being which suggests that the body is served in other ways than in the improvement in carbohydrate metabolism.

14. Experience to date does not warrant the conclusion that the natural function of the pancreas in cases of severe diabetes is either increased, regenerated or diminished because of the use of the extract."

Write to office of Medical Society of Virginia, Richmond, for your certificate entitling you to reduced railroad fare to the Roanoke meeting. A postal card request is all that is necessary.

News Notes

Roanoke Meeting, Medical Society of Virginia.

Supplementing a former announcement relative to the golf tournament, it is now definitely planned to play a handicap of thirty-six holes. The tournament will begin at 10 A. M. Tuesday, the opening day of the meeting, and an exciting contest is anticipated. Up to the present twenty-three members have signified their intentions of taking part in the handicap, and it is planned that cars will leave Hotel Roanoke about nine-thirty for the Country Club, and that eighteen holes will be played in the forenoon, after which luncheon will be served at the Club, and the remaining eighteen holes will be played in the afternoon. The awarding of the cup will take place at one of the social functions later on during the meeting. It should be borne in mind that since the tournament will take place in the forenoon and early afternoon, the regular program will not in any way be encroached upon.

By the way of a reminder, stickers for use upon mailing matter have been arranged for by the Committee in charge, and a supply will be gladly furnished to those who wish to ex-

hibit and to all others interested in developing a good attendance at the meeting.

The Chairman of the Exhibit Committee announces that the demand for space has been very active and that the exhibits promise to be unusually attractive from every standpoint. The exhibit room is conveniently located, well lighted, and an inspection of the list of exhibitors shows them to be such as will guarantee that the latest and best will be shown in drugs, books, instruments and appliances.

The scientific program promises papers on many interesting subjects, in addition to those in the general symposium on "The Pancreas." Dr. Seale Harris, Birmingham, Ala., and Dr. E. P. Joslin, Boston, have accepted invitations from the president, Dr. J. S. Davis, to attend and present papers. Other visitors may be named at a later date.

In addition to the golf tournament, automobile rides and other entertainments have been arranged for members and the ladies accompanying them.

Be sure to write this office to secure your certificate to enable you to have reduced railroad fare.

Ladies—Attention!

The ladies of the Auxiliary to the Medical Society of Virginia are invited to attend the State Convention which meets in Roanoke, October 16-19. A large attendance is earnestly requested as a great many matters of importance are to be decided at this meeting. Roanoke is putting forward every effort to give us a royal welcome. It is necessary to have a "get together" for exchange of ideas, to enable us to have a successful organization and vie with our sister states. A great pleasure is in store, as the new president-elect of the National organization, Mrs. J. Allison Hodges, of Richmond, will attend.

In March, notices were sent to the different counties to organize and to notify the State Secretary, Mrs. Burnley Lankford, that they had received the notices and had organized. Very few have given the desired information. At your earliest convenience, please send the names of your organizations, officers, and also delegates who will attend the Roanoke meeting to the State Secretary, Mrs. Burnley Lankford, 530 Shirley Avenue, Norfolk, Va.

It is very important to have this information at an early date in order to form plans for the convention and to give the Roanoke

ladies an idea of the number who expect to attend.

Mrs. R. LLOYD WILLIAMS, *State President.*

Woman's Auxiliary, Medical Society of Virginia.

The above notice to doctors' wives and daughters is self explanatory. At the meeting in Norfolk, last year, the Woman's Auxiliary to the Medical Society of Virginia was formed. The aim of the Auxiliary is to co-operate with the doctors of the State in their efforts "to educate the public in matters of sanitation and health; to assist in entertainment at State, district and county society meetings; to promote acquaintance among doctors' families, that local unity and harmony may be increased." These matters should be of interest to all ladies in members' families.

Won't you attend the Roanoke meeting and learn more of the Auxiliary's work?

Maternal Welfare Work in Virginia.

In a report recently issued by Dr. W. A. Plecker, State Registrar of Vital Statistics, it was stated that the largest number of sepsis deaths in Virginia during the past ten years was 191 in 1917. Since the placing of midwives of the State under the supervision of the State Registrar, there has been noted a saving of 40 to 50 mothers a year, though this may not be wholly the result of this legislation.

The work begun by the Bureau of Vital Statistics has been taken up by the Bureau of Child Welfare of the State Board of Health under the Sheppard-Towner Act of Congress, the expense being borne by that fund. Mrs. Emily Bennett, a Johns Hopkins nurse, has been placed in charge of this work and is developing it in a splendid manner, building upon the foundation laid by the Bureau of Vital Statistics and working in connection with it. She has been systematically carrying out the Bureau's system of midwife instruction, by courses of lectures given by herself, by county nurses, and by lectures and other forms of instructing mothers and prospective mothers.

The Bureau is anxious to help mothers by sending to all who will request it printed prenatal instructions and booklets. All women are urged to have good medical care.

The Gorgas Memorial.

The House of Delegates of the American Medical Association, at its San Francisco

meeting, by a standing vote endorsed the plan for the establishment of a memorial to General Gorgas, whose genius stamped out yellow fever in Cuba and Panama, and taught the control of these diseases. The memorial will take the form of a research laboratory and a teaching institute for tropical and preventive medicine, and will be located in Panama on a beautiful site on the Pacific shore, donated by the Republic, President Porras, and the citizens of Panama, who have guaranteed the initial building. This is to be known as the Gorgas Memorial Institute of Tropical and Preventive Medicine.

Dr. Franklin H. Martin, Chicago, is chairman of the executive committee, in charge of raising the funds necessary from this country.

Number of Virginians at Mayo Clinic.

It is interesting to note the large number of University of Virginia alumni, who are or were Virginians, who have been at Mayo Clinic, Rochester, Minn., this summer. These are: Dr. A. S. Moore, formerly of Aldie, and Dr. J. L. Crenshaw, formerly of Rapidan, both on the permanent staff; Dr. J. A. Wilkins, Lynchburg, and Dr. R. M. Gilliam, Petersburg, medical and surgical fellows on the Mayo Foundation, respectively; Drs. Wm. E. Bray and I. A. Bigger, University, who attended for the month of August; Dr. J. S. Horsley, Jr., Richmond, who returned the first of September after several weeks' work, and is connected with the surgical and gynecological department of St. Elizabeth's Hospital, Richmond; and Dr. L. M. Blackford, University, who graduated from the University of Virginia this June and, after a couple of months at the Mayo clinic, entered upon his duties as interne at Union Memorial Hospital, Baltimore, the first of this month.

Dr. and Mrs. W. L. Peple,

Richmond, are expected home the middle of this month, after spending several months touring the British Isles, France and Belgium.

Dr. and Mrs. James H. Smoot

And daughter have returned to their home in Woodstock, Va., after an extended visit to New York City, Niagara, Canada and Detroit.

Dr. and Mrs. B. W. Switzer,

Lexington, Va., recently enjoyed a visit to relatives at Rawley Springs, Va.

Married.

Dr. Elbyrne Grady Gill and Miss Ruth Meals, both of Roanoke, Va., June 16.

Dr. Mortimer Harry Williams, Roanoke, Va., and Miss Julia Mountcastle, Weldon, N. C., September 8.

Dr. Millard Bridgman Savage, Norfolk, Va., and Mrs. Esther Lenore Gregory, Washington, D. C., July 9.

Dr. Richard Lee Willis, formerly of Chat-ham, Va., a member of the class of '21, University of Virginia Medical School, and Miss Elizabeth Harris, of Crozet, Va. They will make their home in East Orange, New Jersey.

Dr. James Ernest Stokes and Miss Rebecca Marsh, both of Salisbury, N. C., June 28.

The Southern Medical Association

Is preparing for a big meeting in Washington, D. C., November 12-15, inclusive. Dr. Thomas A. Groover, 1621 Connecticut Avenue, N. W., is general chairman of the local committee; Dr. Philip S. Roy, 1200 Massachusetts Avenue, N. W., vice-general chairman; and Dr. William Cabell Moore, 1824 Massachusetts Avenue, N. W., general secretary. These or Mr. C. P. Loran, secretary-manager of the Association, Empire Building, Birmingham, Ala., will be glad to give any necessary information.

Resident and Travel Scholarships for Physicians.

The American Child Health Association, 370 Seventh Avenue, New York City, has appropriated \$10,000 for resident and travel scholarships to physicians. These scholarships are for the purpose of affording an opportunity to secure training in child health work which will better fit physicians to fill positions with state and municipal divisions of child health or organizations engaged in child health work, or to enable physicians already engaged in the child hygiene field to secure additional training or experience. The fund will be allotted in amounts suited to the objectives arranged for the respective students.

Applicants eligible for these scholarships will be physicians who are in good standing in their local and state medical societies and shall present evidence of the following qualifications:

(a) Graduation from a Grade A medical school and a license to practice in the state from which they apply.

(b) Real interest in child health.

(c) Either special instruction or practical experience in public health or child hygiene, including school health work. Those who have had such experience will be given preference in the selection of candidates.

These scholarships will be given during the school year of 1923-1924, and during the summer of 1924.

Application blanks and further information will be furnished on request to the American Child Health Association.

Dr. and Mrs. W. W. Bennett,

Blackstone, Va., spent a most enjoyable vacation on a motor trip through northern Virginia and Maryland.

Dr. Rufus L. Phipps,

Of Clintwood, Va., was quite seriously injured in an automobile wreck, the latter part of August. It is stated that his arm was broken and shoulder dislocated, in addition to bruises and cuts.

Dr. George H. Reese,

Petersburg, Va., left the middle of August for Rochester, Minn., where he is attending the Mayo Clinic for several weeks.

The American Roentgen Ray Society

Is holding its annual meeting in Chicago, with headquarters at Congress Hotel, September 18-21, inclusive. A number of eminent foreign contributors are scheduled for papers, and announcements indicate that treatment by high voltage X-ray will have a prominent place on the program.

Dr. William C. Powell,

Petersburg, Va., spent some time at Virginia Beach, the latter part of August, enjoying the pleasures of that resort.

Dr. T. E. Chapman,

Formerly of Norton, Va., and at one time president of the Wise County Medical Society, after spending several years in the far west to regain his health, has now located at Joplin, Mo., where he has taken up active practice again.

Dr. A. G. Brown, Jr.,

Has returned to his home in Richmond, after a pleasant vacation spent in the New England States. When in Boston, he had the

pleasure of seeing many interesting and instructive cases in the medical wards of the Peter Bent Brigham Hospital.

The Tri-State District Medical Association,

Comprising the entire states of Iowa, Illinois, Wisconsin and Minnesota and districts of surrounding states, will have their annual assembly in Des Moines, Iowa, October 29, 30, 31 and November 1. Headquarters will be at Fort Des Moines Hotel. All physicians in this State who are in good standing in the State Society are most cordially invited to attend and take part in the program.

This association is a purely post-graduate organization and the entire time of the annual assembly is taken up with scientific study. A number of eminent members of the profession have accepted to take part in the program.

Dr. William B. Peck, Freeport, Ill., managing director, will give more detailed information upon request.

Dr. and Mrs. Stuart McGuire

Have returned to their home in Richmond, after a visit to Nova Scotia and other northern points of interest.

Dr. Basil B. Jones

Has returned to Richmond, and will open offices October 1st in the Medical Arts Building. His practice will be limited to diseases and nutritional problems of infancy and childhood.

Dr. Jones graduated at the Medical College of Virginia in 1916, and for four years did special work in pediatrics at the Boston Floating Hospital, Massachusetts General Hospital, and at the Kingston Avenue Contagious Hospital at Brooklyn. He has been in pediatric practice in Los Angeles, California, for the past two years.

Prizes to Members of Richmond Academy of Medicine and Surgery.

At a meeting of the Richmond Academy of Medicine and Surgery, last year, Dr. J. S. Horsley, of this city, announced that an anonymous friend had offered two prizes, the first, \$100 and the second, \$50 for the two best original papers read before the Academy during 1922. A committee of five was appointed to decide upon these awards, with the result that the first award was made to Dr. Joseph F. Geisinger for his paper on "Reduplication

of the Ureter" which was published in *Annals of Surgery*, May, 1923. The second prize was given Dr. Wyndham B. Blanton for his paper on "The Clinical Significance of Reductions in the White Cells of the Human Blood," published in *VIRGINIA MEDICAL MONTHLY*, April, 1923.

Dr. H. M. Snead,

South Hill, Va., is home again, after a visit to his mother at Fork Union, Va.

Dr. S. W. Maphis

Returned to his home in Warrenton, Va., recently, after a visit to Hot Springs, Va.

Dr. A. M. Showalter,

Cambria, Va., spent his vacation with friends on a camping trip in Maryland.

Dr. Fletcher D. Woodward

Has become associated with Dr. John W. C. Jones, Newport News, Va., and will limit his practice to diseases of the eye, ear, nose and throat. Dr. Woodward graduated from the University of Virginia in 1919, after which he served as an interne at University of Virginia Hospital. He completed a two and a half years' service at Manhattan Eye, Ear and Throat Hospital, New York City, prior to becoming associated with Dr. Jones.

Dr. E. W. Walker,

Recently of Exeter, Va., is now at Appalachia, Va.

Dr. J. J. Anderson,

Formerly of Irwin, Va., after spending some time traveling, has located in Richmond, with offices at 2200 Hanover Avenue. He will be engaged in general practice.

The Medical Association of the Valley of Virginia

Is to hold its next meeting in Staunton, September 27, at which time the election of officers will be held. Dr. Hunter McGuire, Winchester, is president, and Dr. Alex. F. Robertson, Jr., Staunton, secretary.

The Mary Elizabeth Hospital,

Raleigh, N. C., announces the association of Dr. Verne S. Caviness, practice limited to Diagnosis and Internal Medicine, and of Dr. Powell G. Fox, in the department of General Medicine.

Dr. and Mrs. Hunter B. Spencer

Have returned to their home in Lynchburg, Va., after a visit to Canada and Detroit, having returned from the latter place in their car.

Dr. and Mrs. A. J. Hurt

And daughter of Chester, Va., left the middle of August for an extended motor trip in New York and in the New England States.

Dr. Francis J. Ready,

Clarendon, Va., announces that he has moved his offices to 3301 N Street, Northwest, Washington, D. C., where he will continue in general practice.

Dr. Walter M. Babb,

Keyser, W. Va., has been elected president of the West Virginia State Board of Health.

Dr. Buckner M. Randolph,

Washington, D. C., having accepted an appointment as professor of clinical medicine and director of clinics in the Medical Department of George Washington University, Washington, announces that he has withdrawn from the general practice of medicine and will hereafter limit his private work to consultations and referred work. His offices will be at George Washington University Hospital, 1339 H Street, Northwest.

Dr. R. B. Gillespie,

Formerly of this State, but now with the Public Health Service, has been transferred to Tampa Bay Quarantine, Tampa, Florida.

Dr. R. A. McBrayer

Has resigned from the staff of the N. C. Tuberculosis Sanatorium and has located in Shelby, N. C., for the practice of internal medicine.

Dr. and Mrs. J. A. Riffe,

Covington, Va., were recent visitors in Richmond.

Dr. and Mrs. J. Weldon Smith

And daughter, Farmville, Va., spent their vacation on a motor trip through Eastern North and South Carolina.

Dr. and Mrs. Wade C. Payne,

Haymarket, Va., spent a short vacation with relatives in Fredericksburg, Va.

Dr. and Mrs. L. C. Shepherd

And daughter, of Norfolk, Va., spent some time in August visiting in Harrisonburg, Va.

Dr. Allison of St. Louis Goes to Harvard.

Dr. Nathaniel Allison, dean of Washington University Medical School, St. Louis, has resigned to accept the position as head of the department of orthopedic surgery in the Medical School of Harvard University.

Dr. Turner S. Shelton

And family, of Richmond, have returned home after a motor trip through eastern Virginia and North Carolina.

The American College of Surgeons

Is to meet in Chicago, October 22-26, the week immediately following that in which the annual meeting of our State Society will be held. Dr. Albert J. Oschner and Dr. Franklin H. Martin, both of Chicago, are president and director general, respectively.

Dr. D. A. Stanton,

High Point, N. C., has been appointed a member of the North Carolina State Board of Health, to fill vacancy caused by resignation of Dr. F. R. Harris, of Henderson, N. C.

Dr. and Mrs. W. J. Knight

And daughters, Newport News, Va., enjoyed a motor trip in North Carolina in August.

Dr. and Mrs. Ashby Turner,

Harrisonburg, Va., went with some friends on a motor trip to Canada and points of interest in the north, last month.

"Venereal Disease Information,"

A monthly publication, has just made its appearance in magazine form, and is intended primarily for health officers, physicians, nurses and social workers engaged in venereal disease control activities. It is issued by the U. S. Public Health Service, and the price is 50 cents per year, payable to the Superintendent of Documents, Government Printing Office, Washington, D. C.

See notice under secretary's announcements covering reduced rates to meeting in Roanoke. The reductions apply to dependent members of physicians' families in addition to members.

For Sale.

Tidewater Virginia beautiful home and good practice in town of 1,200, with rich surrounding country. Practice will pay for property in a year. Cash required to handle \$2,500. Reason for selling, going to specialize.

If you want a good opportunity and can manage, address No. 273, care this journal.

Obituary

Dr. George Nicholas Acker,

Of Washington, D. C., died from pneumonia July 22. He was 70 years of age and a graduate of the Medical Department of Columbian University, Washington, in 1874. He was for sometime professor of pediatrics at George Washington University Medical School, Washington, D. C.

Dr. James Semple Haile,

Of Chatham, Va., died in Danville, Va., August 12. He was sixty-nine years of age and was formerly a member of the Medical Society of Virginia. Dr. Haile graduated from the University of Maryland, School of Medicine, Baltimore, in 1886, and practiced in Chatham until a few years ago when he retired.

Dr. Cowles M. Vaiden

Died at his home, at Ruthville, Va., August 14, in his fifty-sixth year. He graduated from the Medical College of Virginia, Richmond, in 1892, and was for a time a member of the Medical Society of Virginia. He is survived by a daughter, a sister and two brothers.

Dr. Elijah Filmore Truitt,

Formerly a member of the Medical Society of Virginia, died at his home in Norfolk, Va., September 2. He graduated in medicine from the College of Physicians and Surgeons, Baltimore, in 1883, and was at one time Norfolk County coroner. Dr. Truitt was also a druggist and a pioneer in the establishment of chain drug stores in Norfolk.

Dr. Samuel Major Hodes,

Formerly of Richmond, died August 22, and the interment was made in this city. He was thirty-five years of age and a graduate from the Medical College of Virginia in 1915. Dr. Hodes was at one time a member of the Medical Society of Virginia.

The fact that thousands of physicians are feeding S.M.A. with uniformly successful results, to normal, full-term infants from a few days to one year of age or more, *without any qualitative change, whatsoever*, is convincing proof of the resemblance of S.M.A. to breast milk in all important respects. ~~~~~

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Virginia Medical Monthly

OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Fifty-fourth Annual Meeting, Roanoke, October 16-19, 1923.

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Original Communications

BILATERAL NEPHROLITHIASIS.

By ROBERT C. BRYAN, M. D., F. A. C. S., Richmond, Va.

Unilateral stone is far more common than bilateral, the right kidney more often affected than the left. It is well known that Jews are more liable to stone in the kidney than any other race, and the reports of the Johns Hopkins Hospital show there has never been a stone in the kidney of the negro.

The determining factor for the immediate production of stone is the formation of a nucleus, whether it be bacteria, blood clots, shreds of tissue, colloidal matter, parasites, such as schistosoma hematobium or filaria sanguinis hominis. Infection apparently does favor stone formation, but the character of the germ must be taken into consideration. For pyelitis is much more common in the female, eight to one; and stone more common in the male; the colon bacillus, the more frequent cause of pyelitis, is never found in stone. It has likewise been suggested by Rovsing that certain foods that contain alkaline waters predispose to phosphaturia and that certain acids such as grapes and tomatoes produce oxaluria. Rosenbach has produced stones in rabbits and dogs by feeding them oxamid. Cutting off the nerve supply and putting foreign bodies in the kidney immediately start stone production. The most frequent age for stone in the kidney seems to be between twenty and thirty, and each decade following shows a gradual diminution in the predisposition to stone formation.

It is of interesting clinical significance that stone does not occur more frequently on both sides simultaneously. These obscure etiological factors that bring about crystallization should oftener be bilateral. We not infrequently see recurrence of stone on the same side within a few months of a previous operation, the other side escaping this cyclic production. Recently we removed from the left side a stone in the ureter and two months

later a large stone from its corresponding pelvis, which had not shown formerly by X-ray examination. And the question of stone escaping X-ray examination is ever with us, throwing no shadow, which it could not do by virtue of its chemical consistency.

Braasch consummated the question of stone formation recently, at a meeting of the Southern Medical Association in Chattanooga, when he stated:

"In the study of the etiology of urinary concretions, we deal with an abnormal type of crystalline precipitation. To ascertain what mechanism is at fault in causing the atypical deposition and fusion of these crystals into a stony concrement is the problem that has confronted us for some time. The power of the urine in health to hold the constituents of calculi in solution, or to bring about their deposition as isolated entities, is due to the presence of finely divided particles of organic matter, the so-called *protective colloids*. Experiments have suggested that stone formation might be due to one of several factors: (1) the excretion of an excessive quantity of crystalline material beyond the power of the urinary colloids to maintain either in solution or deposition of isolated noncoalescent crystals; (2) a deficient amount of protective colloid in the urine; or (3) the precipitation of normal colloids or masking of their protective activity by bacterial exudates or by foreign colloidal matter excreted as the result of an abnormal metabolism. It has been demonstrated that colloidal matter going beyond the limit of that capable of being handled by the urinary colloidal machinery fusion of crystals occurs and calculus formation took place.

"Experimental production of an excessive excretion of calcium oxalate in the urine over a prolonged period of time would result in the aseptic formation of calcium oxalate calculi. Furthermore, it was shown that the mechanism of such calculus production was related to a change in the morphology of stone-forming crystals from a non-fusing to a fusing or coalescent type. The physico-chemical influence of colloidal matter on crystalline morphology may theoretically, at least, be applied. We may assume that, by enormously increasing the quantity of the crystalloidal calcium oxalate in the urine, we overwhelmed the protective colloids of the urine which were present only in amounts sufficient to maintain the solution or crystalline isolation of the quantity of calcium oxalate normally present. When the quantity of oxalate excreted passed the limit of that capable of being handled by the urinary colloidal machinery, then fusion of crystals and calculus formation took place.

"The second phase of our experimental problem, namely, to produce a deficiency in the quantity or

quality of protective colloid in the urine of animals, has thus far been baffling. However, Lichtwitz has demonstrated that the removal of colloidal matter from urine in vitro, either by extraction with ether or benzine, or by dialysis, uniformly results in a precipitation of phosphates or of calcium oxalate. Furthermore, Schade, of Kiel, in 1909, produced stony masses in vitro by clotting fibrinogen in the presence of freshly precipitated phosphates, oxalates and carbonates, thus giving tremendous impetus to the significance of colloidal factors in stone formation.

"Studies tending to show that bacterial exudates may cause an interference with normal urinary colloids in a manner to bring about an atypical precipitation of the urinary crystals and consequent stone formation have been even more fruitful. Rose-nov and Meisser, working with streptococci from the urine of patients with multiple recurrent calculi, have repeatedly produced calculi in the kidneys of dogs by the method of specific bacteriology. These streptococci were implanted in devitalized teeth of dogs, which developed urinary calculi consistently after an interval of several months. Such experiments can best be explained by assuming that the bacteria have a specific elective activity on the renal tubules, thus producing a low grade inflammation. The exudate from this inflammatory reaction pours out abnormal colloidal matter into the urinary stream. This we may assume so interferes with the normal colloidal balance of the urine that its solvent power no longer obtains, that deposition of fusing crystals takes place and stone formation occurs."

It is interesting to note the prevalence of stone in the right kidney. Is it due to the anatomical association of the renal pelvis on this side with the colon, a transmural bacillary infection being encouraged? Or, is it simply the expression of a congested kidney, slowing of the blood current, stagnation and crystallization from the preternatural mobility of the right side added to the exciting causes as brought out by Braasch?

It is not the intention of the writer to take up the pathology of the kidney in its response to this foreign body, for pyelitis, pyelonephritis, pyonephrosis are progressively in order, the decision to be made is the state of the kidneys, their relative standards to recognized tests, and the probability of a favorable outcome. That kidney showing by chemical and laboratory examinations the highest index is the first to be operated on, and after a reasonable length of time the other organ may be attacked. The value of repeated indigo-carmin, phthalein and thorough urinary examinations, supplemented by complete blood retention tests is evident; in one of our cases this was done five times.

The writer has had the opportunity to notice bilateral lithiasis in several instances and would call attention in one case to that of twins, men, age thirty, who developed and

were operated on within a month of each other for stone in the kidney, both on the left side, there having never been any evidence of stone previously, nor has there been since the operation, which was carried out some ten years ago.

The following cases are referred to as instances of bilateral kidney stones:

(1) T. H. M., age forty-one, male, reported to the hospital March 1, 1920. Ten years ago had pain in left side; since December has had pain in both sides; five or six attacks on the right side and three on left; no hematuria. Cystoscopic examination showed the right ureteral os to be small, slightly reddish, and this side could be catheterized for only a distance of two c. m. The left ureteral mouth is found more posteriorly, behind a distinct brim, the catheter on this side is arrested at eight inches, but a free flow of urine emits from this side, one and one-half ounces in about two minutes, which is under considerable pressure. Four c.c. are further aspirated from the catheter. The left kidney is injected with twenty-four c.c. of a twenty per cent solution of sodium bromide and X-ray taken. X-ray examination showed a stone in the pelvis of the right kidney a little larger than a date seed, dilatation of the pelvis of the left kidney, hydronephrosis and hydro-ureter, probably the size of a cigarette; no stone on this side noted. Urinalysis: *right side*, pale watery, nearly clear, sediment scant, acid, no albumin, occasional blood cell, few pus cells, crystals 0, casts 0, epithelial cells few large round and caudate; *left side*, smoky red, very cloudy, sediment heavy red, acid, albumin abundant, blood bulk of sediment, pus few cells, crystals 0, casts 0, epithelial cells occasional large round, mucus no excess. March 5, 1920, under general anesthetic, the usual kidney incision on the right side was made, there was a very short intercostal space, and the patient being quite stout, it was with difficulty that the kidney was reached. It was, however, finally freed from its bed, dislocated downward enough to bring the upper part of the right ureter into the field. A small irregular hard apparently phosphatic stone was densely wedged in the ureter about two inches beyond the pelvic junction. A longitudinal incision was made over the stone and it was removed, the ureter brought together with two sutures of 00 catgut, drain put down to the site of the ureter, tissues brought together with catgut No. two, silkworm gut through skin. Patient made an

uneventful convalescence, leaving the hospital March 25th. Cystoscopic examination having revealed a stricture of the left ureter and X-ray showing a moderate hydronephrosis and hydro-ureter the size of a cigarette, the patient returned at intervals for dilatation of this stricture. On April 30, 1921, patient returned to hospital complaining of pain in left side so severe he was unable to work. X-ray examination was negative. Cystoscopic examination showed that the old stricture had been dilated so that an olivary bougie went readily to the pelvis of the kidney. This was followed by a No. five French ureteral lead catheter and there was an immediate flow from this side signifying pelvic distention. The left pelvis was aspirated and 12 c.c. of a heavy flocculent urine withdrawn. Patient was inverted and 9 c.c. of a 1-1000 mercurochrome 220 injected into the pelvis of the kidney and held there four minutes. In view of the history, the repeated outbursts of pain, absence of stone by X-ray examination, the character of the urine, a diagnosis of infected hydronephrosis was made and irrigations of the kidney advised. Urinalysis of the catheterized specimen showed color very pale, nearly clear, sediment scant, faint alkaline, small amount of albumin, occasional blood cell, good many pus cells, crystals 0, casts 0, epithelial cells occasional large round, other sediment few bacilli. Remarks: Stained sediment shows many cocci and bacilli, none acid fast. May 12, 1921, cystoscopic examination showed left os pouting but the crater not unduly red; it is readily catheterized, catheter mounting to pelvis of kidney without apparent pain or embarrassment. Fifteen c.c. of a twenty per cent solution of sodium bromide is injected into the pelvis of the kidney and pyelogram taken which shows a large stone in the pelvis of the left kidney, with kidney much enlarged. The stone apparently was about three-quarters of an inch long. May 17, 1921, under general anesthetic, a left lumbar incision is made, kidney readily reached, but many dense adhesions were found about the upper pole so that it could not be liberated satisfactorily. There were likewise many adhesions anterior and posterior to the hylum of such a dense character we did not dare to break them for fear of rupturing some of the blood vessels. The kidney was very large, varying in consistency, of a dark purplish-blue color, with evidences of an increased intrarenal pressure. Since the kidney could not be brought up in

the wound an incision was made along the lower part of its convex border, finger thrust into the pelvis readily detected the stone, which was apparently in the pelvis of the kidney and projecting downward into the ureter. The incision in the kidney liberated from the pelvis quite an amount of pus and debris which had been dammed back by the stone. The stone was removed with forceps and corresponded with the X-ray picture. Kidney was sewn through with wide mattress catgut sutures, drain placed in the upper angle of the kidney bed and brought out through the lower part of the incision. Muscles were approximated with catgut No. two, silkworm gut through the skin. Patient made an uneventful convalescence and has had no further pain or trouble.

(2) Mrs. W. Y. J., age fifty-nine, married, five children. Reported to the hospital July 27, 1921, giving history of intense pain in both sides and throughout abdomen. The present trouble began in May, 1912, with severe pain in both sides, radiating forward and downward across the abdomen and into the pelvis, pain more severe on the left than on the right side. The attack lasted several hours and was followed by a chill and fever. The acute attack lasted only a few hours, but left side has been sore and uncomfortable ever since. Three years previously had similar attack. Patient has difficulty of breathing at times, with feeling of pressure at angle between ribs. Appetite poor since May, digestion good, no jaundice, somewhat constipated, nocturnal polyuria two to three times, never passed any gravel. W. B. C. 10,000. Urinalysis: straw, cloudy, 1,010, faintly acid, trace of albumin, sugar 0, bile 0, indican 0, acetone 0, blood 0, pus abundant, amorphous matter 0, casts 0, epithelial cells moderate number of squamous, irregular and large round, mucus 0, other sediment bacteria. Renal efficiency forty-five per cent. Cystoscopic examination showed considerable debris and floating cloud in bladder medium which required irrigation for a clear field. Mucosa normal, nothing abnormal is seen, no trabeculae. The left ureteral os is readily catheterized No. five French catheter mounting to the pelvis of the kidney without pain, spasm or trauma and there is an immediate flow of heavy cloudy urine which fills a 20 c.c. test tube in four minutes. The right os is likewise apparently normal, but a No. five French catheter mounts only 20 cm. when it is arrested and will go no further. There is no flow from this

side and when irrigated there is no return flow other than that put in. Patient taken to X-ray room and $4\frac{1}{2}$ c.c. of a twenty per cent solution of sodium bromide injected on the right side and 6 c.c. on the left side and pyelogram taken. It is predicted that there will be no result from the right side as the fluid is noted to return along side of the catheter. One c.c. of phenol-sulphonaphthalein is injected in the vein of the left hand and appears in the urine in three minutes on the left side and, since there is no flow from the right side, catheter is not kept in two hours as it is believed the former test showing forty-five per cent represents only the left kidney. X-ray of right side shows a very small kidney with a shadow in the upper portion. The left kidney is normal in size and shows two fairly large stones occupying probably the two lower calyces. July 30, 1921, under general anesthetic, the left kidney incision was made. No attempt was made to deliver the kidney into the wound, but its pedicle was more or less satisfactorily squeezed by the left hand and incision made along the convex border into the lower part of the pelvis. A branching stone filling the lower calyx was felt, but attempt to remove it with forceps was unsuccessful. It was necessary to break through a rather dense cicatricial band constraining this lower calculus before it could be removed. Since we were unable to find the round symmetrical stone shown by the X-ray in the upper part of the pelvis, we were inclined to believe this was a dense fibrosis of the pelvis throwing a shadow. A rubber tube was placed in the lower part of the kidney bed, and through and through mattress sutures of catgut No. two put through the substance of the kidney, three in number, the free edges of the incision being brought together with catgut No. two silk-worm gut through skin. August 1, 1921, about seven p. m., patient died apparently from shock, having never reacted thoroughly.

(3) Mrs. W. C. H., w., age fifty-three. Reported to the hospital October 25, 1922, complaining of pain in right groin, also pain in left side extending from the left kidney into the left iliac region. Twenty-three years ago passed a stone the size of a hazel nut and fifty bird shot stones, followed by frequent attacks of pain so severe as to require morphine. Condition diagnosed as "floating kidney," wore supporter. Three years ago had osteopath and condition became worse. August, 1921, X-rayed and plates showed enlarged left kid-

ney with small stone, right kidney also showed stone not as large as that in left. Operated on December, 1921, large stone removed from the pelvis of left kidney and about a pint of pus evacuated. Left hospital February 3rd, wound still draining; remained home two months; returned to the hospital and a pint of pus was drawn from the left side, drainage tube replaced, which remained in for six months. Wound closed. Physical examination showed well nourished woman, heart normal but for soft presystolic mitral murmur at apex. Lungs negative. Blood pressure 124-84, pulse rate 86. Cystoscopic examination showed bladder capacity normal, mucosa normal, but in the bladder medium heavy tenacious products indicative of a long standing chronic kidney involvement were floating. The left os were small, its crater uninvolved, mucosa normal. This ureteral os was readily catheterized, catheter mounting without any pain or trauma some 20 to 25 cm.; there was no flow, however, from this side although the catheter was irrigated with boric acid solution to assure ourselves there was no blocking of the tube. The right os was swung well to the right, a little difficult to catheterize, its appearance slightly pouting and tightish. This side was likewise catheterized with a No. six French leaded catheter which mounted easily to the pelvis of the kidney and there was an immediate flow of clear amber colored urine which half filled the 10 c.c. test tube in about three minutes. The flow coming abruptly to a stop would indicate that the intrapelvic tension was quite high, expelling its contents under pressure. Two and a half c.c. of a four-tenths per cent indigo-carmin was given into the right median basilic vein at 11:52, appearing at 11:58 along the side of the cystoscope, evidently coming from the bladder. At 12:04 there were evidences of its appearance through the ureteral catheter on the right side. The bladder appearance was taken to be due to a temporary blocking of the ureteral catheter and this test represented the right side exclusively, nothing having been gotten from the left. Patient taken to X-ray and serial X-rays taken. Ten c.c. of a twenty-five per cent solution of sodium bromide injected into the left pelvis and pyelogram taken. Five and a half c.c. of a twenty-five per cent solution of sodium bromide is injected into the right pelvis and pyelogram taken. X-ray showed a large stone in the right kidney and small stone in the left kidney. Urinalysis: pale amber, slight cloud.

sediment scant gray, faint acid, albumin small amount, blood few cells, pus good many cells, crystals 0, amorphous matter debris, casts 0, cylindroids 0, epithelial cells few large round, mucus no excess. Remarks: Stained sediment shows good many clusters of cocci, also of acid fast bacilli. Examination of blood showed W. B. C. 13,600, polys seventy-five per cent, small and large mononuclears twenty-seven per cent, hemoglobin seventy per cent. Renal efficiency November 3, 1922, twenty per cent; November 7, twenty per cent; November 10, thirty per cent; November 19, twenty-five per cent; November 29, twenty per cent. Report on blood showed on November 20, urea 90 mg. per 100 c.c., urea nitrogen 42 mg. per 100 c.c., November 29, 82 mg. urea per 100 c.c. and 38.5 mg. urea nitrogen per 100 c.c.

In consideration of the foregoing the following observations may be stated:

1. Every patient with a stone in one kidney should have both X-rayed as bilateral nephrolithiasis we believe to be more frequent than is supposed.

2. In suspicious cases, indicated by urinalysis and subjective signs, pyelograms with sodium bromide should be used to prove out the presence or absence of stone. This spraying of the stone with a shadow throwing fluid has at times been confirmatory of an opinion which could only be guessed at otherwise.

3. Particular emphasis is laid upon the ingestion of large amounts of water preparatory to operations, or getting the kidney in the "habit of working" so that the strain of operation will be minimized.

4. We believe that the re-formation of stone in a kidney operated upon is caused primarily by the leaving of small particles from the original operation. Irrigation of the pelvis at the time of operation with the double flow catheter would obviate an appreciable per cent of so-called recurrence of stones.

5. In those instances in which the stone has been soft, or examination of it shows some particles or fragmentation have been left behind, we have used a tube put in the pelvis of the kidney for irrigation and drainage for several days. Not only the debris but likewise blood clots which cause much of the pain and distress following the operation are in this way removed.

BLOOD TRANSFUSION, INDICATION AND METHOD.*

By HERBERT C. JONES, M. D., Petersburg, Va.

It is the purpose of this paper to give a brief survey of the development of blood transfusion and to discuss modern conceptions of its uses and methods. It is impossible to say when and where the idea of transfusion first originated, probably the first case on record is that of Pope Innocent VIII, who was operated on in April, 1492. "The vital powers of Innocent VIII rapidly gave way; he had for some time fallen into a kind of somnolence which was sometimes so profound that the whole Court believed him to be dead; all efforts to awaken his exhausted vitality had been resorted to in vain, when a Jew doctor proposed to transfuse the blood of some young person. Accordingly the blood of the decrepit old pontiff was passed into the veins of the youth, whose blood was transferred into those of the old man. The experiment was tried three times at the cost of the lives of the three boys, probably air getting into the vein, but without effect to save that of the Pope." This is the first case in which death is ascribed to air embolism.

It was not until the nineteenth century, following the work of Blundell in England, that transfusion was used with any success. Like every other big achievement in medicine, many failures were made. Medical societies even ostracized men who advocated its use. Most of the early advocates used lamb's blood and cases of leprosy and hydrophobia are recorded as cured.

It remained for Blundell to show how the effects produced by a loss of blood could be remedied by transfusion. Eight ounces of blood was withdrawn from the femoral artery of a dog. Most alarming symptoms developed: shortness of breath, convulsions, and loss of sensibility. After some seconds, six ounces of blood were taken from another dog and injected into the femoral vein with the result that recovery of the dog was complete. He then did a second experiment, allowing the blood to flow from the femoral artery to the femoral vein by means of a tube. This experiment offers the basis for the present day cannula method.

In 1875 Guerrin cut the femoral arteries of two horses and connected the peripheral end of

*Read at the meeting of the Southside Virginia Medical Association in Petersburg, March 1923.

one with the central end of the other, and *vice versa*. This gave a continuity of blood stream and was continued indefinitely until the small horse became plethoric. It was then stopped and both horses made an uneventful recovery.

Landsteiner in 1901 demonstrated the presence of isoagglutins in the blood and divided human beings into three groups according to the kind of agglutinin present. A fourth type was added several years later.

G. W. Crile may be called the real pioneer of modern blood transfusion. Around 1900 he perfected a method of anastomosing blood vessels; intima to intima by the employment of a cleverly devised cannula. He put the method into practice experimentally and in clinical research, reporting 225 experimental and 32 clinical transfusions. At first he anastomosed artery to vein and later showed that transfusion could be successfully and more readily accomplished by vein to vein anastomosing. This work stimulated the profession as to the value of transfusion as a therapeutic measure. Many new devices for transferring blood soon appeared. Dr. Crile and his assistants at Lakeside Hospital, Cleveland, Ohio, probably do more transfusions than any other one group of surgeons. They know it to be a safe procedure and their patients are transfused on the slightest indication, both preoperative and postoperative, thus making good surgical risks of questionable cases and shortening their period of convalescence. In late years the method of transfusion at Lakeside Hospital has been changed, a simpler method, which will be described later, being substituted for the arteriovenous anastomosis.

With the development of simpler methods of technique and with the introduction of accurate blood tests, transfusion has lost the danger which once attended its use, until today it is a safe and proved therapeutic measure—rather than a last resort.

Transfused blood increases the bulk of circulating fluid and raises blood-pressure. It provides new oxygen and food for the body tissues. It increases coagulability. It stimulates the blood forming organs and increases the resistance to infection.

Of course the most direct indication of transfusion is hemorrhage, whether it be acute or has been occurring over a long period of time. It is in this group of cases that one sees most marvelous results. A person actually dying

from the loss of blood could be saved with a quart of blood, or less, provided the leaking blood vessel is tied and the cause of the hemorrhage removed. A recent case of the writer clearly demonstrated this fact. Mrs. E., 37 years of age, was taken suddenly with violent pains in the lower abdomen. She became pulseless and semiconscious in less than one hour. Six hours later a diagnosis of ruptured ectopic pregnancy was made. She was given salines under the skin and by the bowel, the abdomen was quickly opened and the ruptured tube and blood vessel tied. The patient was then given 900 c.c. of blood, and before she was removed from the operating room she was conscious and her pulse, beating at a rate of 90, was of good volume. She made an uneventful recovery, her temperature never going over 100½ degrees. She was discharged from the hospital on the twelfth day.

Not only in acute hemorrhage is transfusion of value. Many a woman with a bleeding uterus, whether it be from a fibroid, polyp, or a hypertrophic endometritis, will be made a good surgical risk, and her convalescence shortened.

Shock is second only to hemorrhage as an indication for transfusion. The patient who suddenly becomes pulseless and pale during or immediately following a major surgical procedure can be quickly revived with an immediate transfusion. The blood-pressure in these cases is the simplest guide as to whether the transfusion could be performed. A blood pressure of 80 systolic or lower is an indication for transfusion.

Many surgeons today are wisely resorting to transfusion to prepare their patients for major procedures. Especially is this true for cases in a weakened condition whether it be due to an old pus kidney, a bleeding ulcer of the bladder, or a hypertrophied prostate. So today in many of the large hospitals we have a routine typing of the blood on entrance of the patients when a major surgical procedure is in prospect. Thus a telephone call will bring a donor who is suitable and the family is saved the trouble of hurrying here, there, and everywhere to find some one who will gladly give blood. Routine typing should also apply to typhoid cases.

Hemophilia in the newborn babe offers a great field for transfusion. A 10 c.c. Luer syringe full of whole blood injected into the

anterior fontanel in infants, or intramuscularly into the buttocks, will often stop the hemorrhage whether it be from the umbilical cord, mouth, stomach, or bowel. The blood taken from the father seems to act more quickly. The writer has seen only one such case. Hemorrhage from the cord and mouth are successfully controlled by the injection of blood into the anterior fontanel. The infant's blood does not have to be typed until after the second year. Cases of recovery from purpura hemorrhagica are on record following transfusion. However, in many cases it has been used in vain.

The value of transfusion in the blood diseases, namely, pernicious anemia, splenic anemia, leukemia, and hemolytic jaundice, of course, is not as evident as in hemorrhage or shock. In all of the cases the writer has seen there has been an improvement. This improvement is not so marked when the condition resulting from many of the above mentioned blood diseases is grave. A patient with pernicious anemia will often be free from symptoms for several months following the transfusion, only to have a return of symptoms. These cases should be transfused for the comfort which comes to the patient during the interval following the transfusion. Transfusion certainly has no place in acute lymphatic leukemia, being a valuable therapeutic measure only brought into disrepute. However, in myelogenous leukemia and hemolytic jaundice it is of value in prolonging life. It is a matter of record that a case transfused for a blood condition is more liable to have a reaction following the transfusion. This is probably due to the presence of hemolytic agents in the blood.

In septicemia and chronic suppurative conditions, transfusion offers hope in that the patient's resistance is increased by the introduction of healthy red cells and a consequent rise in blood pressure. It is probably wise to transfuse these cases early because a weakened heart muscle results from the toxins present in such conditions and cardiac dilatation may result from the extra work thrown on the weakened heart muscles.

Recently, research work has been carried out in Toronto General Hospital to determine the value of whole blood in the treatment of extensive burns. It is found that the procedure is of great value, not only in the early treat-

ment of shock but later as a means of combating toxicity. A rapid rise in the total urea nitrogen in the blood in these cases offers an index as to the advisability of transfusion. The writer has seen three cases in which there was a drop in temperature and a general improvement following transfusion performed to combat toxicity following extensive burns.

When to transfuse and when not to transfuse is often a question. In answer to these questions one might say, when in doubt transfuse; as to when not to transfuse, the writer would say, when an increase in the volume of blood might cause disaster to the patient, as evidence of cardiac dilatation or pneumonia.

The minute a question of transfusion arises, a donor should be sought—a healthy young man or woman who will give his or her blood either for friendship or money. As a rule, several members of the family should be typed and from those found to be of the same type as the patient a donor is selected, preferably the most healthy one. The possible donor is then questioned to determine the possibility of syphilis, a Wassermann always being done if the emergency permits, also a complete blood count is usually made and a careful examination of the heart and lungs. Oftentimes the emergency will not allow such a careful examination and then the most available donor is taken.

As to the typing of blood, one might say that it is the most important part and should always be done with care because experience has proved that faulty typing is the cause of most of the misfortunes of transfusion. Requiring about thirty minutes it is a simple procedure in the hands of the trained.

Human blood belongs to one of four types, the type being determined by matching the blood with known serum types; only a drop of blood is required from the patient and donor. The direct method is probably more valuable in determining the amount of reaction a patient will have, but it requires more blood and takes more time to perform.

There are many methods of doing blood transfusion, most of which can be done and give the same results. Some methods are preferred to others because they are simpler and do not require the skill; other methods because they produce less reaction. The direct method is used less today than several years ago, not because it is not a safe and logical procedure,

Very few reactions have been noted and these reactions were not severe, there being an average rise in temperature of about two degrees.

Transfusion should always be performed with the most rigid asepsis and, performed in this manner, is a most valuable therapeutic measure. Wisely employed transfusion will often prove a life-saving resource; unwisely used it will surely become discredited.

THE SCIENCE OF REFRACTION.*

By EMORY HILL, M. D., Richmond, Va.

Refraction, like medical practice in general, is both a science and an art. The effectiveness of the art is in direct ratio to the understanding of the science. There is a vast difference between the haphazard results of a practice based on the individual's experience in doing many times what he has never learned to do accurately, and the uniformly good results of making what is a mathematically exact measurement based on well established principles of physiologic optics. General medicine may be practiced by the application of treatment found to satisfy many patients after looking at the tongue, feeling the pulse, and boiling the urine in a test tube to see if it becomes cloudy; but the modern internist is a safer advisor because his treatment is based upon more exact knowledge of the patient's physical arrangements. This contrast is no greater than that between the refraction often done and the refraction which may be done if we seriously undertake it. Refraction as an applied science, rather than merely an art, is my subject. This means substantially the use of objective tests of refraction as a foundation for subjective tests, and this, in turn, resolves itself largely into a question of cycloplegia.

If the curriculum of the medical schools were not already overcrowded, it would be worth the student's time to take a course in medical history. A perspective of the progress of science would teach him to avoid some mistakes of his predecessors, and to cling tenaciously to some of the achievements of past generations. The latter might well be the result of a review of the history of refraction in America. One of the epoch-making events in American medicine was the announcement by Weir Mitchell in 1879 that certain headaches are due to the nervous strain entailed by the use of defective eyes and that such headaches can be relieved by the exact

correction with lenses of the errors of refraction of such eyes. At Mitchell's instigation the science of refraction was put into practical use by Philadelphia ophthalmologists, with the aid of atropin used sufficiently to produce complete and prolonged cycloplegia. It is to be observed that this achievement was not the result of somebody's individually discovered pet method of manipulating lenses, not by "fogging" the vision, not by sitting the patient before a formidable looking instrument called the ophthalmometer and reading off a formula, not by any of the methods taught in a school of optometry; but by the application of perfectly well-known laws of physiologic optics, laid down by Donders in 1864 in his classic work which is not a popular book on the shelves of the present-day specialist. Good refraction was done in other places and can be done today without slavishly following every detail of the Philadelphia method of 40 years ago; but we shall always owe a large debt of gratitude to the men who showed us how to make refraction work about the most mathematically exact thing in the domain of medical science.

A further development in American medicine occurred, perhaps inevitably but to the detriment of ophthalmology, when the era of specialism arrived. It may be doubted whether a practice confined to so narrow a specialty as ophthalmology was possible outside the large cities, or whether the postgraduate facilities available could have supplied the needed specialists for a rapidly growing population. In any event, the desire to enter special practice, and the rewards of such specialization as compared to the modest income of the general doctor, led to an urgent demand for postgraduate instruction, which was supplied by brief courses in eye, ear, nose and throat hospitals and clinics in the medical centres. Quantity production seems to have been the ideal, and the result was the hasty acquisition of rule of thumb methods of doing a routine office practice and the simpler surgical procedures, together with a kind of refraction which has little to commend it over the optician's practice. The situation appears to have grown worse instead of better in the past few years. With the war, graduate study in Europe was abandoned and the staffs of the better ophthalmic clinics in America were depleted. Following the war, a general discontent with medical practice in rural communities and family practice in the smaller towns

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has developed. Today we find the ranks of our specialty increasing at a surprising rate. It would seem that eye, ear, nose and throat work has a fascination exceeding that of any other branch of medicine. We see very few men going into the specialty through the need for such work in their own communities and their recognized obligation to meet this need by gradually acquiring special knowledge; we see very few men undergoing a rigid training of two, three or four years in the medical centres. On the contrary, we see many men leaving a good general practice to take a few weeks or months of postgraduate study, which is at best a kindergarten course, and settling in a somewhat larger community as full-fledged specialists. I am not competent to pass on the character of their work in otolaryngology, but I venture the opinion that they are exceptionally gifted individuals who can learn to do uniformly good refraction in less than a year of constant practice at the side of an expert; and I am at a loss to know how they ever acquire the necessary experience in a busy routine of isolated practice three-fourths of which bears no relation to ophthalmology.

The failure of the rank and file of ophthalmologists to perform their duty as refractionists is shown in the very general confusion of the layman's mind as to the meaning of the words oculist and optician; we may well ask ourselves if there is a difference as clear-cut as we ought to have made it. The prominence of the so-called optometrist, who is called "Doctor" by his clientele, is embarrassing to us, and I know of no way to lessen the embarrassment except to look our faults in the face and see wherein we have failed to live up to the obligation which was met by our predecessors who took seriously the subject of physiologic optics, used cycloplegics with thoroughness, and devoted sufficient time to refraction to ensure exactness. If otolaryngology is our chief interest, and ophthalmology a side issue, we shall not do good refraction. If surgery is our main concern, we shall not find the tedious routine of refraction work agreeable and it will be neglected. I am well aware that ophthalmology and otolaryngology can be practiced together with faithful zeal and skill; too many members of this society are living proofs of this possibility to let us doubt the fact; but I do deplore the evident and acknowledged lack of interest in refraction among

some of our numbers who do it at all only because it is the conventional thing.

The results of the most painstaking refraction work, as taught by the late Wm. Thomson and S. D. Risley of Philadelphia, by Duane of New York, Jackson of Denver, and others among the masters in ophthalmology, are satisfactory to largely over 90 per cent of our patients. I doubt whether the many short cuts in use in our offices today can show anything even remotely approximating this. Guesses may give 50 per cent of successes, and long experience in guessing may add to the percentage; but guessing is not warranted where certainty is possible, and certainty is possible in nearly all cases. That we cannot obtain 100 per cent of successes is due to some conditions beyond our control and others which we may control if we will. We can refuse to undertake a refraction for a patient who wants to catch the next train. We can demand two days as a minimum for the patient who does not require a cycloplegic, but merely a mydriatic, three days for the patient who requires a cycloplegic. We can elicit a history which shows that the eyes are not alone at fault and insist upon other study of the case to arrive at the cause of the symptoms. We need more intimate co-operation with the family doctor. Eyes are not isolated organs and the ophthalmologist ought not to be an isolated practitioner. We are at a disadvantage when the patient lives at a distance and cannot return for further observation. We are helpless when confronted by the patient who will not acknowledge his difficulties and inadequacies for his business and domestic life, and insists that a pair of glasses shall cure a mind diseased and restore domestic felicity. Eye troubles are sometimes defense reactions and require a psychiatrist instead of an ophthalmologist. Then there are patients who absolutely refuse to consider a refraction as anything more important than buying a new roll of film for a kodak. There remain, however, the very great majority of our clientele who want scientific refraction and will take the time for it. What is their due? With exceptions always to any rule, a routine of thoroughness can be outlined which I venture to state as follows:

Children should be refracted with atropine. Their eyes, if they need any attention, are worth more than two weeks of schooling. Atropine sulphate in 1 per cent solution, used three times daily for a minimum of 3 days,

is necessary for complete cycloplegia. This may be insufficient. It is easy to demonstrate the fact that accommodation still exists, and to continue the atropine one or two days longer. No marked discrepancy should exist between retinoscopic and subjective findings. It is sometimes necessary to prescribe lenses on the basis of retinoscopy alone, and one's retinoscopy should be dependable except in those cases where distorted or clouded media interfere. This thorough routine is especially urgent in squint cases, where a full correction is necessary to abolish that excess of accommodation which brings on excessive convergence.

Young adults may need atropine as much as children. This can be determined by testing the remaining accommodation after homatropin has been used. The history and symptoms of the individual case may point to the need of rest to an overtaxed ciliary muscle. The therapeutic effect of atropine upon the entire uveal tract should not be forgotten. Mydriasis and temporary cycloplegia are by no means the total effect of drugs used for the measurement of refraction. The majority of adults can be refracted satisfactorily with homatropin. A 2 per cent solution used, a drop at a time, until 6 drops have been instilled in the course of 30 or 40 minutes gives sufficient cycloplegia in 1 to 1½ hours in most cases. Any marked disagreement between retinoscopic and subjective findings suggests remaining accommodation and calls for more cycloplegia. Repetition of the drops on a second day, or the use of homatropin three times daily followed by intensive use in the office may be necessary in these cases. Post-cycloplegic tests are of greater value in adults than in children, because fixed habits of ciliary muscle strain interfere with the comfortable use of a full or nearly full correction. This applies to the hyperopic correction only. Of course the cylindric glass is kept at the strength found under cycloplegia. The optician's argument that cycloplegia is useless if the prescription for glasses is not identical with the findings under cycloplegia is based upon gross ignorance and needs no refutation. Post-cycloplegic tests are of greatest use in persons who are presbyopic.

Myopes are perhaps the most neglected people whom we refract. Young myopes accommodate, because that is the natural and inevitable thing for any eye to do even if the result is futile; and they accommodate because they

usually have an astigmatism which they are trying to overcome. Therefore, myopes need cycloplegia for refraction, and the disastrous results of unchecked myopia justify as thorough use of cycloplegics as does hyperopia. The ease with which myopes can get improved distant vision with lenses is really a misfortune. If it were not so easy to sharpen their vision, they would not be so carelessly treated. Increasing visual acuity is not the only aim of the refractionist; indeed, it may be a calamity if it is secured at the expense of a ciliary spasm.

Cycloplegics are as necessary in people 40 years of age as in younger people, and often more necessary. Duane has called attention to ciliary spasm at this age and beyond. This type of case requires individual study; no hard and fast rule can be laid down. To cease using cycloplegics at 40 years, or 45 or 50 years, is an utterly irrational thing. In general, the older the patient the less cycloplegic is necessary; but this rule has so many exceptions that it cannot be followed. It is taken for granted that the usual observations to exclude glaucoma have been made. The bugbear of glaucoma raised by the incompetents in and out of the profession need not frighten us.

There is no eye in which a small pupil allows the careful study of the eye ground which should be a part of every refraction and the satisfactory retinoscopy which also should be part of every refraction. When cycloplegia is unnecessary, mydriasis is of great value. This need not be extreme mydriasis, but the pupil should not contract sharply when light is thrown into the eye. Old people have small pupils and frequently sclerosed lenses; therefore, they particularly need a mydriatic for refraction. One or two drops of a 2 per cent solution of euphthalmine or encatropine enables the observer to study such eyes and does no possible harm. The practice of doing manifest refractions without study of the eye grounds in old persons precludes accuracy in fitting glasses and also the discovery of valuable diagnostic signs of local and general disease. Such scant respect for the eyes of the old is responsible for some of the blindness from chronic glaucoma which occurs while the unfortunate victim is waiting for an imaginary cataract to ripen.

In short, refraction is a matter of scientific accuracy if we choose to make it so. Experience increases the percentage of satisfactory

results from the practice of an art; but without a thorough grounding in the underlying science no uniformly good results will follow. If we cannot demonstrate from our case histories over 90 per cent of satisfied patients whom we have refracted, something is wrong with our methods. The largest single factor in good refraction is cycloplegia; other important factors will be considered by the speakers who follow.

DIAGNOSTIC METHODS IN REFRACTION WORK.*

By HUNTER H. MCGUIRE, M. D., Winchester, Va.

To attempt to discuss the many and varied problems of refraction work before a body of men whose daily activities are largely concerned with all phases of this branch of our specialty would be an undertaking which would involve, not only an immense amount of labor, but would be a repetition of facts which have been brought out in the mass of literature which has been devoted to this subject.

It occurs to me, therefore, that it would be more profitable for those of us, to whom has been assigned the task of leading the discussion in this symposium, to give our individual views on those methods of examination which have proved to be the most efficient in our experience and to point out, if possible, the relative value of the various methods which have been advocated.

Inasmuch as the large majority of patients who come to us for the relief of ocular troubles are victims of eyestrain resulting from errors of refraction or muscular anomalies and, inasmuch, as our success in ophthalmology is largely dependent upon our ability as refractionists, it is evident that the importance of the subject cannot be overestimated and that nothing should be left undone to make perfect our technic in estimating the error and to give us an unerring judgment in correcting it.

At the outset and before taking up in detail some of the diagnostic methods which have proven useful to me in handling such cases, I wish to emphasize one phase of the subject, upon which I have always felt that insufficient stress has been laid in text books and in journal articles. I refer to the importance of systematic history taking and to the necessity for obtaining from the patient such facts as have a direct bearing upon the treatment of

his case. Study the patient, his occupation, his environment, his habits, the position he assumes in reading and at his desk, his facial expression, his carriage, and his mental makeup. Give him time to tell you in his own language how he suffers, and obtain from him, by direct questions, the symptoms which need correction.

Bear in mind that the presbyopic bank clerk who is constantly shifting his position and thereby altering the distance in his near work, though he may show the same amount of presbyopia, will necessarily require a very different correction from the man of letters who pores over books in a fixed position, in an easy chair, and who, because of his culture, expends a greater amount of nervous energy in his work.

The high-strung neurasthenic type whose symptoms are always exaggerated and who seeks your advice for the relief of manifestations which are either real or imaginary, must be approached in a far different manner than would be necessary in the man of health and vigor, whose mental poise is well established, and who is essentially a more normal individual. The estimation of the error and its correction in the case of the former will necessarily involve a greater degree of accuracy and a more careful attention to detail than would be regarded as essential in the case of the latter.

The seamstress, bending over her task from early morn to late at night, more often than otherwise, in badly lighted and ill ventilated rooms, though she may show the same type and amount of error as her more fortunate sister, who lives under ideal conditions with her eye-work limited to a perusal of the social column in the daily press and a study of the latest fashion charts, will of necessity, require greater assistance to her overworked ciliary muscles and more intelligent advice regarding the proper care of her eyes.

It is with the aid of these few crude examples and the enunciation of certain, which may seem to be very elementary, principles, that I am seeking to drive home a principle which I believe is frequently overlooked in our very busy lives and the observance of which I regard as very necessary if we are to become successful refractionists. And it is simply this: In undertaking the treatment of any refraction case, study the individual as well as his eye. The adoption of such a policy will not only serve to give us the best results in the

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treatment of these cases but will eradicate from the public mind a misconception, which I sometimes fear has become deep rooted, with regard to the nature of our work and the association of ocular disturbances with general systemic involvement.

The methods we adopt in the examination and treatment of refraction errors should of themselves convince the public that the eye is not merely an optical instrument standing apart and exercising an independent function of its own, but that it is an important part of the human economy with errors and diseases closely associated with other organs of the body and that physicians who have devoted their life's work to the study of its abnormalities are alone capable of correcting them.

The comprehensive study of a refraction case, as is well evident to all of you, involves an immense amount of painstaking labor and many methods have been suggested for determining the type of error and its amount. I shall only discuss, as briefly as possible, those diagnostic measures which, in my daily routine, have impressed me with their value and which have enabled me to solve difficult problems with comparatively little labor and without sacrificing accuracy.

For purposes of description these methods may be divided into objective and subjective determinations. Before taking up in detail the various means of diagnosis, I wish to go on record as saying that it is my firm conviction that the correct interpretation of a refraction error, except in the case of illiterates and young children, can only be made by the use of both objective and subjective methods. I do not believe that one can be depended upon to the exclusion of the other. The true state of the refraction can only be determined by a judicious use of both methods.

With regard to objective determinations I shall limit my remarks to the ophthalmoscope, the ophthalmometer and the retinoscope.

It may seem superfluous to even mention to a body of ophthalmologists the importance of a complete ophthalmoscopic examination in patients who come to us for glasses, and yet all of us know of men of ability who are perfectly capable of interpreting fundus pictures, who seem quite willing to complete their investigations and prescribe for the patient without knowing the condition of the eyeground and the state of the refractive media. If satisfactory central vision is obtained from sub-

jective tests, they seem quite willing to assume that the entire fundus is healthy and the patient is sent on his way rejoicing in the fact that his new glasses are giving him wonderfully acute vision when, not infrequently, an insidious pathologic process is developing in the periphery of his eyeground. In most instances this omission on the part of the oculist is due either to the necessity for saving time both to himself or his patient or to the knowledge that a large majority of refraction errors are unassociated with ocular lesions. It seems to me, therefore, and I have adopted this practice in my daily routine, that the ophthalmoscopic investigation should be the first method of diagnosis to be employed in the study of the refraction error. By means of it we are enabled to determine very quickly whether we are dealing with a diseased or a healthy eye, the type of error can be determined, and its amount can be approximately estimated. With this information in hand, the subsequent procedures can be utilized with a greater degree of satisfaction and accuracy than would otherwise have been obtained. No refraction case should be discharged until a complete ophthalmoscopic examination, if necessary under a mydriatic, shall have been made.

We are all perfectly familiar with the limitations of the ophthalmometer, in that its records are only concerned with the anterior surface of the cornea. Keeping this fact in mind, however, I regard it as a valuable aid in the diagnosis of most astigmatic errors. In high degrees of error, particularly in post-operative astigmatism, it will usually give reliable information as to the axis and approximate strength of the cylinder to be prescribed. In small degrees of astigmatism, with the rule, its readings are not always verified in the subjective tests. This, of course, can be explained by the fact that lenticular astigmatism will frequently be associated with the corneal defect. In astigmatism against the rule, it usually will, in my opinion, give fairly accurate readings. Irregular astigmatism is very quickly recognized by the use of this instrument and by reason of this fact the subjective examination in these cases is made less tedious both to doctor and patient. As an axiomatic fact it may be stated that the ophthalmometric readings, while valuable as aids to diagnosis, should never be adopted in the final prescription for lenses unless they agree with the retinoscopic findings and the subjective tests.

Ophthalmology owes a debt of gratitude to Jackson and Thorington for elaborating and perfecting the technic of retinoscopy. In my opinion, it is by far the most reliable of all the subjective methods for determining the character and amount of the refraction error. While to the beginner it may seem to be a difficult method to master, most observers will agree that if its details are carried out with the precision and care which have been advocated by experts in this means of diagnosis the results will be most gratifying. Constant practice on the various forms of schematic eyes is certainly a valuable method for developing a high degree of efficiency in the performance of this test. In children and illiterates it is, obviously, the one method upon which we can place the greatest reliance, and in these cases, it is my belief that it can be depended upon to the exclusion of all others. While some observers are of the opinion that satisfactory results may be obtained from the retinoscope without resorting to complete cycloplegia, my experience has convinced me that accuracy in this method of diagnosis is dependent upon full relaxation of the accommodation. In executing the test, I have found in my own case, that working at a distance of one meter with a plane mirror and adding or subtracting one diopter, as the type of error indicates, has given me the most satisfactory results, though I realize that this is largely a matter of personal preference.

In the subjective determination of the refractive error and the estimation of the various types of heterophoria, the intelligence of the patient is a potential factor in enabling us to make logical deductions from the findings. Given, however, a fair degree of intelligence on the part of the patient and a non-irritable state of mind on the part of the examiner, the working out of the refractive state resolves itself into a very interesting problem. Even in patients who are mentally alert, I believe it is well, in some instances, before beginning the subjective examination, to explain very carefully that it is not their mental faculties we are investigating but their visual powers and that the latter will be more accurately determined if the imagination is not brought into play, and if for the moment they can forget they have a mind.

I believe that most ophthalmologists are of the opinion that in the diagnosis of the refractive error by the subjective method the results

obtained from the use of the trial lenses and test cards are to be regarded as final and that in the ultimate solution of the problem this procedure may be looked upon as the court of last resort. While in the main I fully concur in this opinion. I think there are certain conditions which materially influence the findings by this method and which, not infrequently, may lead to inaccurate conclusions. Fatigue of the ciliary muscle from too prolonged efforts to bring out the manifest error is certainly one factor to be reckoned with and will often bring about misleading results. It is far better, in my judgment, to make the patient return for frequent short examinations than to persist for a long period in the attempt to measure his error when his muscles are fagged.

Improper or inadequate illumination of test cards is another condition which interferes with accurate results in the subjective tests. The plan suggested a few years ago by a Committee of the American Ophthalmological Society, or some of its modifications, is admirably adapted to office requirements. Reflected light of daylight intensity and evenly distributed over the test object makes an ideal illumination and is far superior, in my opinion, to some of the more elaborate designs in which the source of light is placed behind the test object and the rays directed through some translucent material.

The advantage of conducting the examination amid quiet surroundings must be apparent to all of us. I do not know of anything more disconcerting to the patient or more annoying to the examiner than the presence of solicitous friends or relatives in the refracting room who either persist in prompting the patient or from idle curiosity make a complete investigation of the office equipment and all the while make audible comments when you are endeavoring to secure the intelligent co-operation of the patient. These then are some of the factors which materially influence the findings in the subjective examination and should, if possible, be eliminated if our patients are to secure the best results from our efforts.

The method of procedure in the use of the trial lenses is so familiar to all of you that it hardly seems necessary to go into details with regard to their use. There are, however, certain refinements in trial case accessories and in the construction of trial frames which, in my opinion, have been of great practical value in

diagnosing the refraction error by the subjective method.

In bringing out small degrees of astigmatism and in locating the axis of the cylinder with precision, the cross cylinder is a quick and efficient agent and enables the examiner to employ plus and minus cylinders in the further steps of the examination with a greater degree of confidence in his judgment. It is likewise particularly useful in checking up the final correction to ascertain if the strength of the sphere or cylinder should be altered. This little device which was first described by Jackson thirty-five years ago has not received, in the literature, the attention it deserves. In my judgment it is by far the most useful method of estimating astigmatism and accurately locating the axis of the cylinder by the subjective method. A detailed description of its use and value is given by Dr. Crisp of Denver, in the March number of the *American Journal of Ophthalmology* and I would strongly urge that this article be given your careful consideration.

In some cases of astigmatism where it seems difficult to find the principal meridian of greatest and least curvature, the stenopeic slit is a useful agent in bringing out these meridians and, while I do not employ it as a routine method of examination, it certainly is of value in many instances. Recent advances in the construction and adjustments of trial frames have certainly, it seems to me, been of very material aid in enabling the refractionist to obtain better results and to give him the assurance that his findings are more scientifically accurate than was possible with some of the very crude contrivances we were obliged to use in former years. The independent pupillary and vertical adjustments together with improved methods of raising, lowering and tilting the frame and of placing the trial lenses at the correct distance in front of the cornea are all features which have contributed to more exact results. The more elaborate apparatus which in compact form includes batteries of trial lenses, rotary prisms, Maddox rods and other devices for diagnosing the refraction error and bringing out the various forms of heterophoria constitutes, in my opinion, a distinct advance in the examination of the refraction case, but I do not believe it will ever entirely supplant the trial frame and test lenses. It is a convenient and quick method of diagnosis and has the dual advantage of enabling the examiner to make a

more rapid change in lenses and of producing less fatigue to the patient. The muscle tests embodied in the instrument, by reason of their fixed position and the ability to absolutely level the apparatus before the patient's eyes, are much more to be depended upon and give more accurate results than do the same tests when used in the usual trial frame. I have used practically all makes of this apparatus and as new models have appeared have added them to my equipment and, while I am convinced that they serve a very useful purpose in the examination of the patient, I do not believe that they have yet reached that degree of perfection when it would be safe to discard what might be termed the old fashioned trial case. My usual custom is to examine the patient with this instrument but always check up its findings with the correction in the trial frame and in the final analysis my deductions are based upon the results obtained from the latter. In other words, I feel, as far as the refraction error is concerned, that the trial frame correction more nearly approximates the formula to be given the patient than can be obtained from any other form of instrument.

This communication would not be complete unless some mention was made of the valuable contributions Duane has given ophthalmic science with regard to the importance of testing the accommodation in the examination of the refraction patient. If, as he has pointed out—and I think his position is unassailable—we meet with many cases of subnormal accommodation, we are overlooking a very important factor if we fail to carry out the very simple and quick method he has suggested for estimating the power of the accommodation.

With regard to the use of cycloplegics in refraction work, I can only say that I am a strong advocate of and systematically relax the accommodation in all ages up to forty years of age and, in many patients between forty and fifty, I find it necessary to complete my investigations with the aid of homatropine. With this brief statement I shall not further discuss this portion of the subject, as I understand it will be fully covered by another speaker.

The diagnosis of the various types of heterophoria and the association of these anomalies with the refraction error will likewise be discussed in another paper, so I shall not attempt to do more than to say that I regard these tests as a very essential part of the examination

and in the correction of the refraction error they play an important role. I do feel, however, that the multiplicity of methods which have been suggested for bringing to light the various phorias and for estimating the duetion have created more or less confusion. In my own work in recent years I have largely confined my investigations of muscle balance to the use of the Maddox rod and rotary prism and this one method has usually given me satisfactory results. In executing any of the muscular tests emphasis should be laid upon the necessity for estimating the degree of heterophoria for both the distance and the near correction.

In concluding what I have attempted to present in a rather desultory fashion, I feel that in summing up the whole matter I cannot do better than to quote Duane, whose researches have contributed to such a great extent in putting refraction work on a scientific basis:

"I think the whole matter of handling refraction cases may be summed up in these two maxims: First, let us find out all we can about the eyes we are treating and the symptoms of which they are a part; using to this end every means that experience has proved to be helpful, never doing the work in a hurry, and remembering always that this work of all others requires patience, thoroughness, and accuracy.

"Second, let us constantly bear in mind the fact that we are treating patients, not eyes; that we are handling human beings, not machines; and that we cannot do our best work unless in each case we put ourselves in touch with the individual man before us, showing sympathy for his troubles, consideration for his infirmities, and an understanding mind, to take in all the physical and mental factors which may affect his outlook on life, and determine his need for refractive or other correction."

THE ETIOLOGY AND PATHOLOGY OF CANCER.*

By K. D. GRAVES, M. D., Roanoke, Va.

Cancer is one of the oldest diseases with which the human race is familiar. Even back in the days of Moses, the semibarbarian Egyptians recognized and respected it, treating it with caustics and escharotics. The oldest literature of India and Persia carried references to it. Hippocrates was cognizant of its

dangers, and treated it by burning. Celsus, at the beginning of the Christian Era, excised cancer of the breast, advising against removal of the pectoralis major. Even during the dark ages men knew and dreaded it and speculated as to its cause.

The year 1824, in which the achromatic microscope was discovered, marks a new milestone in the history of cancer. An entirely new visualization of this disease was had, due to the study of the cells under the microscope. New theories were evolved in the scientist's study, to be exploded in his laboratory. Another era was ushered in in which practically every observer had a different opinion, each clamorously presenting his views on the subject, each unable or unwilling to admit his fallacies. The theories that cancer originated from the exuded elements of the blood, the specific cancer cell, etc., all had their noisy expounders, demanding recognition which, if given, was short lived.

Finally, Thiersch and Waldeyer proved conclusively the principle of the exclusive epithelial origin of cancer which is now generally accepted. In a word, this theory is that cancer can only arise from the epithelial type of tissue, and not from connective or lymphatic tissue. Cancer in the human is considered as being not hereditary, not contagious, possibly capable of being transmitted by grafting, probably being directly or indirectly influenced by such factors as trauma, irritation, X-ray burns, fetal rests, etc. Of these, probably one of the most important is trauma. Eliminating such factors as casual burns, surgical or accidental cuts, etc., such constant and repeated trauma as produces, day after day, erosion, crushing or bruising, is believed to lead to cancer. This is especially well illustrated in the chimney-sweep's knee.

We often see lesions which, for lack of a more comprehensive term we call "precancerous." Probably a better term would be "early cancerous." Experience has taught us that the little place on the lower lip, or the cervix, indurated and eroded, which does not seem to cause much discomfort but just does not heal up, microscopically often shows signs of activity, such as a few poorly differentiated cells which appear to be breaking through the basement membrane; or erosion with marked thickening of the surface epithelium, with here and there long or short fibrils of epithelial tis-

*Read as part of symposium on Cancer at meeting of Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

sue reaching down into the underlying connective tissue. These are distinct sign posts marking the cross roads of divergence between benign and malignant growth and, if ignored, we all too soon realize our error and are brought face to face with a malignant reality.

Cancer may be visualized as normal epithelial tissue run amuck. In studying a microscopic slide of an epithelioma, for instance, we see the orderly line of the basement membrane suddenly broken, the cells lose their individual characteristics and become poorly differentiated, and show a marked tendency to spread by extension of growth. Outcroppings of the same type of growth appear deeper in the tissues, and we know by experience that this growth will continue unless checked by heroic measures. Cancer may be said, pathologically speaking, to recognize few laws and no restrictions.

In conclusion, I would say that, although cancer is one of our oldest and most dreaded and dreadful diseases, its causes are among the least well understood. Much has been accomplished in ruling out certain etiological factors. Much remains to be accomplished in the way of positive information. Why, for instance, should the wart on the face of a lady I saw last week, which she had nurtured for fifty years, suddenly take on such activity as to threaten her life, liberty and pursuit of happiness, if let alone? No one knows.

However, the eyes of the medical world are focused expectantly on the cancer problem, and we confidently hope that within the next few years the enigma of the why and wherefore of malignant disease will join the ranks of such diseases as syphilis, malaria and diabetes; which we predict will happen not through the study of manifest malignant changes, but through the careful routine examination and earnest consideration of those early deviations from normal tissue, which are termed "pre-cancerous lesions."

Lewis-Gale Hospital.

SYMPTOMATOLOGY AND DIAGNOSIS OF CANCER.*

By W. H. RIBBLE, M. D., Wytheville, Va.

The symptoms of cancer, as laid down in the textbooks, are those of a new growth or ulceration. At first, these growths give so little

trouble that the patient looks upon them lightly and does not consult the physician till there is a rapidly growing tumor, with adhesions to adjacent parts, metastases, extensive ulceration, cachexia, etc. When these symptoms have developed, the disease has usually gotten beyond control and 90 per cent of those affected have received their death sentence. To save this large per cent, we must look for the premonitory symptoms and deal with them before they become cancer.

The safest remedy for snakebite is to know the habitat of the reptile and kill the "snake in the grass" before he bites you. The safest remedy for cancer, likewise, is to know *its* habitat and what produces it, so that we may attack it in its incipency.

When a section of cancer is placed under the microscope, we find the fibrous stroma filled with cancer cells, pre-natal epithelial cells, embryonic epithelial cells, or whatever we elect to call them. But all agree that they are epithelial. It is perfectly logical, therefore, to conclude that epithelial tissue is the habitat of cancer and, for the sake of argument, we will state that the cause of cancer is any persistent irritation which may provoke epithelial cells to excessive proliferation.

When the ovum is excited to cell proliferation by contact with spermatozoa, the epiblast, one of the three primitive layers of cells, gets busy, involutes and differentiates into anything from the delicate tissues of the brain to a toe-nail or tooth, according to what is needed at a particular point to perfect an organism.

After this active differentiation and proliferation has fulfilled its mission of construction, it quiets down to a simple maintenance of the tissue formed. But, let some persistent destructive or irritating agent continue to invade or irritate one of these tissues, and these epithelial cells are again excited to activity. They begin to proliferate rapidly, as they did in the vivified ovum. But they find no new tissue to form so they continue to proliferate blindly till they become so numerous that they cannot live or let live, and we have a cancer. If some of these cells get into a lymph channel, they migrate to glands, the liver, spleen, lungs, kidney, and even the bones, producing secondary or metastatic cancer.

Following up the idea, let us review the most frequent seats of cancer and see if they are not where the peaceful cell life is so

*Read as part of symposium on Cancer at meeting of Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

molested that it becomes a case of "beware of the fury of a patient" cell.

The uterus is most frequently affected, next the breast, and we must admit that these organs (in the same order) are subjected to more stimulation and irritation than any other organs in the body. Fifty per cent of all cancers develop in the intestinal tract. Of the intestinal organs, the stomach is most frequently attacked, next the rectum, then the colon. (The small intestines are rarely affected). The stomach receives the ingesta, most frequently excessive in quantity, poorly masticated and of irritating nature. It passes into the small intestines in a liquid, partly digested state, with but little to create irritation. Passing into the colon, it becomes more solid, moves more slowly and often "rests," producing an irritating constipation or colitis. In the rectum (the cesspool of the body) it accumulates, becomes still more solid, and often "rests" quite a while and irritates the epithelial lining of this organ.

Fifty per cent of face cancers are located on the lower lip. Watch the lower lip and see how often it is between the teeth, how often it is bitten, moistened and dried, becoming fissured and abraded and how these abrasions are picked and bitten.

Conheim, observing that cancer shows a preference for the orifices, attributed this fact to "rests" from pre-natal embryonic complications: but, is it not just as likely that it is because the epithelium at the orifices is subjected to excessive irritation, by the sphincter muscles and what passes through the orifices?

I have seen cancer of the tongue, buccal mucous membrane and lower lip develop at a point of constant irritation by a rough tooth; one on the anus, where lack of cleanliness matted the hair and caused abrasion; and one on the heel, where a slight wound was kept irritated by a shoe. Does not all of this suggest that, if we look upon these chronic sores and neoplasms as being premonitory symptoms of cancer and deal with them radically, we may save many lives; and likewise, with chronic mastitis, uteri which are chronically affected, and with unyielding erosions of the cervix uteri?

The early symptoms of internal cancer are so obscure that they are seldom diagnostic, so an exploratory operation is being strongly advocated where there is a reasonable suspicion.

Lunger and Neuberger call attention to the presence of spirochetes in the gastric juice as of value in the diagnosis of gastric carcinoma. And Julius Friedenwald and George H. Grove, Trinkler and others have demonstrated the value of "the blood sugar test as an aid to the diagnosis of gastro-intestinal cancer." Articles on these two latter subjects may be found in the second volume of *"The Medical Interpreter."*

I have purposely avoided a rehash of the symptoms and diagnosis of cancer with which we are all so familiar, and simply want to emphasize the fact that our cancer cases are dying and becoming more numerous and that we must do something that we have not been doing to alter this sad fact.

I remember hearing Dr. Joseph Price, of Philadelphia, read paper after paper on the subject of cancer and how he treated it. The last one was after he had lost his youthful enthusiasm and was about to "lay down de shovel and de hoe" and he was honest enough to say in the windup, "Gentlemen, all my cancer cases are dead."

I fear that most of us older men must subscribe to this statement but I hope you younger men may find some means to have better luck.

X-RAY TREATMENT OF CANCER.*

By B. E. RHUDY, M. D., Abingdon, Va.

It is fairly generally admitted that roentgenotherapy has a very prominent place among the so-called remedies or cures for cancer, radium and surgery being the only other therapeutic agents of popular use. Generally speaking, what can be accomplished with radium can be accomplished with roentgen rays and *vice versa*. However, there are cases which seemingly, because of their nature or peculiar location or extensiveness, are better adapted to treatment by roentgenotherapy, while there are others which are probably better treated by the application of radium. There are others which we are convinced should be treated by the means of both agents; especially do we have in mind malignancies of the genito-urinary apparatus.

For the best results the cases must be carefully selected and sometimes it is necessary to combine irradiation with surgery. If irradiation is used in conjunction with surgery, it is

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best used prior to it, but is also a very valuable prophylactic measure following operation.

It is generally conceded, I believe, that some means of irradiation, such as X-rays in conjunction with the introduction of radium into the uterine cavity, is considered the method of choice for treatment of all cases of primary cancer of the uterus. According to statistics of cases treated at the larger clinics, with irradiation properly carried out, we may expect a large percentage of cures in these cases.

It is stated, especially, by those who are using radium extensively, that operation is probably a mistake after all evidence of the tumor has disappeared; that if a cure has been produced, operation is unnecessary and, if it has simply caused degeneration of the tumor cells and their encasement in fibrous tissue, operation can only serve to destroy the framework of fibrous tissue and free the cells for further activity.

Prophylactic irradiation before and after operation has become quite popular, especially in cancer of the breast, and in many clinics post-operative irradiation is carried out routinely. The pre-operative treatment of breast cancer is much less popular but seemingly rests on a more scientific basis than post-operative irradiation, thereby minimizing the injurious effects of the operation. Objections to pre-operative irradiation are offered by some surgeons such as that the healing of the wound is delayed. On the contrary, a prominent surgeon recently stated that he had observed that in the cases which had received irradiation, the wound healed better and left a better scar. The objection that the operation is made more difficult is the one probably most frequently offered, except seemingly there is some increased tendency to hemorrhage; if performed immediately, it is difficult to conceive that such an objection is valid.

William S. Stone, in reviewing more than 10,000 neoplastic cases which have been under his observation during a service of seven years at the Memorial Hospital, New York City, the majority of which have received X-rays or radium treatment, states that he believes the adoption of pre-operative treatment in mammary cancer will show that the field of applicability of the radical operation should be much restricted, and that it occurs to him that the presence of hard, fixed nodes in the apex

of the axilla makes the case as unsuitable for a radical operation as does the presence of supra-clavicular nodes. It is a question then, how long it will be before the radical operation for breast cancer will be entirely discarded.

The results of the use of X-rays and radium on the osteogenic tumors, which are frequently applied on account of their inaccessibility to surgical procedures, because of their peculiar location, leads one to think that with their earlier recognition by means of clinical history and X-ray study, irradiation may prove to be an efficient substitute for incision and curettage or even amputation.

The treatment of malignant conditions of the skin is probably one of the most useful fields of irradiation as well as the most satisfactory. The malignancies of the skin that we are frequently called upon to treat are the squamous-celled and basal-celled epitheliomata. The basal-celled epitheliomata is one of the most satisfactory types of malignancies to treat because of its slow course and because it frequently does not involve the surrounding lymph nodes. Radiotherapy seemingly is the treatment of choice for these lesions, because of the ease or simplicity and painless application, to say nothing of cosmetic results, the production of a soft and relatively small scar; the latter is often to be considered, inasmuch as these lesions so frequently occur about the face. Frequently it is possible to keep this type of malignancy under control in the more extensive growths and to apparently produce a permanent cure in many of them. Irradiation of superficial lesions should be carried out deliberately, for it is better to give a little too much than to give too little. In conjunction with the thorough irradiation of the entire field of the primary lesion, the regional lymph nodes should be thoroughly irradiated, with the view of closing the lymphatics. We must keep in mind the likelihood of extension by metastasis for we can no more hope for results by treating a portion of the tumor than can the surgeon hope for success by removing only a portion of it.

In dealing with the treatment of malignancy of any part of the human body by roentgen ray therapy we are at once confronted with difficulties, due in the first place to the lack of definite knowledge as to the extent of invasion

of adjacent and deeper structures; in the second place, to the inaccessibility of the deeper parts of the growth to effective radiation; and in the third place, the effect the rays will have on the cells of the normal tissues. To treat properly any malignant tumor, one must know, if possible, the effect of X-ray upon the normal as well as the malignant cells.

There has been comparatively little work done, until just recently, to show the effect of radiation on the normal tissue. The introduction of any therapeutic measure has always been accomplished by an over-estimation of its curative powers which, in the course of time, had to be modified when a more mature judgment prevailed. In roentgen ray therapy, especially when using the more penetrating or short wave length rays, we are threatened with a set-back on account of a variety of injuries resulting from the therapeutic application of the rays. Roentgen injuries have occurred and will occur in the future, and cannot be avoided with absolute certainty, but irradiation is comparatively safe in the hands of a competent operator. These injuries may be divided into two groups: local and general—injuries caused by exceeding the tolerance of tissues and resulting from defects of radiation technique. Local injuries must be distinguished from general or systemic injuries such as acute blood tissue injuries or destruction of the red blood corpuscles. Destructive changes in the blood occur during each therapeutic irradiation which is employed for the destruction of pathological cells; therefore, it is important to have the patient entirely screened or protected from the rays, leaving only the area intended to be treated exposed. Other injuries sometimes caused by irradiation are often spoken of as "roentgen sickness" which may include nausea, vomiting, headache, and perhaps diarrhea. This probably can be much alleviated, in most cases, by proper preliminary preparation, as well as proper screening and ventilation during period of irradiation.

The general health of the patient must be considered also, because of the so-called toxemia which results from irradiation—a subject which deserves much consideration, especially in case of elderly persons. A complete blood count and hemoglobin should be made and repeated at intervals on all cases. This should be used as a guide in carrying out treatment

for any malignancy. Transfusion may at times be quite beneficial.

In observing the general condition of the health, it is important to determine the status of patient, whether certain findings are due to hemorrhage or from a necrotic tumor from cachexia or from metastasis.

Generally speaking, the therapeutic results of irradiation depend upon the size, extent and condition of the tumor; the size, however, is of less importance than the extent and condition. For instance, if it has extended to the bone tissue or cartilage, the results are less favorable. Infected neoplasms respond very unfavorably to irradiation, and a prognosis should be carefully guarded in these cases.

Because of the condensation of such a big subject as treatment of cancer by roentgen ray therapy, one can scarcely do more than generalize; therefore, I have purposely refrained from touching upon the technical phase of this subject; also I have refrained from presenting even a resumé of the results in the cases which we have treated, as too short a period has elapsed since we commenced using roentgen ray therapy in the treatment of malignancies to venture to speak in terms of cure. However, I shall be very glad to report at some future time on a series of cases which we are now treating.

In conclusion, it may be stated with little fear of being too radical that, in addition to supplanting surgery as the method of choice in a number of types of malignancy, irradiation has greatly limited the field of application of radical surgical procedure in many others. The use of X-rays and radium, therefore, have made greater refinement in diagnosis essential. To this end the patient's welfare is best conserved by obtaining the co-operation and knowledge of the internist, pathologist, surgeon and roentgenologist.

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VITALIZING OBSTETRIC RECORDS.*

By M. PIERCE RUCKER, M. D., Richmond, Va.

Case notes serve at least three functions, two immediate and one remote. First, the act of taking notes promotes accuracy of observation and thoroughness. The second immediate reason for a case history is that it is a guide for the management and treatment of the case, all the more important as methods of precision become more numerous and complicated. Finally, the notes are a permanent record of your work. When properly kept and utilized, they are the raw material for statistical studies. It is to this phase of the question that I wish to direct your attention.

Beginners in medicine are prone to attach too little importance to the two immediate functions of clinical records and too much importance to their statistical use. The fourth year medical student and the hospital interne hear so much about a series of 500 cases of this or a 1,000 cases of the other that they get the idea that the chief use of the record which they are struggling so to keep up, is to fit into some more extended series. When these same sheets are dumped into closets and store rooms in more or less hopeless confusion, the tyro loses heart and his note-taking suffers in consequence.

In my experience with medical students, the best way to promote the habit, I might almost say the love, of history-taking is to make the histories available to the students themselves and to encourage their use of them. The histories of the out-patient obstetrical department of the Medical College of Virginia are indexed and bound, and the bound volumes are kept in the library. The cases are indexed not only by name, but also by parity, presentation, methods of delivery, complications, etc., so that the students can easily find out what the experience of their predecessors has been in any problem in which they may be interested. To further stimulate this interest, Dr. Baughman, as a part of the regular didactic work, assigns to each student some simple problem to be worked out from these records. In this way

the men get in a practical manner, an idea of how provoking it is to have to throw out this case because the race is not stated or that one because the age or parity is left off, or the other one because the ultimate result is not known.

With the idea of making our records even more available, for the last eighteen months I have been working out a system of coding each case, so that it can be put on a card with a number of punched holes in such positions that the cases can be analyzed by machinery as is done in the Census Office and elsewhere. The idea was first suggested to me by Mr. M. N. Fisher, Statistician for the State Industrial Commission, who very kindly made me a provisional code from which the code we are now using has gradually developed. I might say that for the very reason that the code has grown as the work grew, the arrangement is not always logical, and that there are a number of minor changes I would like to make in it, but to do so would necessitate my destroying all the cards that have been punched, and beginning all over again. The code gives a number to each phenomenon we wish to consider, just as the International Classification of the causes of death gives a definite number to each disease or cause of death, the difference being that the code can be changed to suit the needs of any particular study. Pearl* has shown the uses it can be put to in general hospital work and in the department of urology. The code I submit is designed to meet the needs of obstetrics and minor gynecology.

CODE FOR ANALYSIS OF EXPERIENCE IN THE PRACTICE OF OBSTETRICS.

CASE NUMBER (1-5)

Previous admission	x
M. C. V.	y

CONJUGAL CONDITION (6)

White	1
Colored	2
Single	x
Widowed	y

AGE (7-8)

Previous Cesarean section	x
Previous eclampsia	y

PREVIOUS CHILDREN (9-10)

Twins	x
"Several"	y

NUMBER OF MISCARRIAGES (11)

"Several"	x
Previous ectopic	y

*Read at the fifty-third annual meeting of the Medical Society of Virginia in Norfolk, October 31-November 3, 1922.

*Pearl, Raymond: Modern Methods in Handling Hospital Statistics, Bull. Johns Hopkins Hosp. XXXII: 184, 1921.

HEART (12)

Normal	0
Systolic murmur	1
Aortic murmur	2
Irregular	3
Presystolic murmur	4
Organic disease (broken compensation)	5
Endocarditis	6

LUNGS (13)

Normal	0
Tuberculosis	1
Bronchitis	2
Cough, no rales	3
Healed tuberculosis	4
Asthma	5
Pleurisy	6

WASSERMANN (14)

Negative	0
Positive, one plus	1
Positive, two plus	2
Positive, three plus	3
Positive, four plus	4
Previous positive reaction	5
Treated	x

BLOOD PRESSURE (15)

100 or under	1
101 to 149	2
150 to 199	3
200 and up	4

URINE (16)

Normal	1
Albumen, trace	2
Albumen	3
Sugar	4
Casts	5
Pus	6
Blood	7
Retention	x

PELVIS (17)

Normal	1
Justo-minor	2
Flat	3
Flat contracted	4
Funnel	5
Justo-major	6
Nagele	7
Kyphosis	8

ATTENDANCE (18)

Hospital	1
Home, unattended	2
Home, physician	3
Midwife	4
Another physician	5
Consultation	6
Office	8
Students	x
Prenatal care	y

TOTAL DURATION OF LABOR IN HOURS (19-20)

Dry labor	x
Precipitous labor	y

DURATION SECOND STAGE IN MINUTES (21-22)

Two hours	x
Three hours or more	y

PRESENTATION (23)

R. O. A.	1
L. O. A.	2
R. O. P.	3
L. O. P.	4
Face	5
Brow	6
Breech	7
Shoulder	3
Not pregnant	9
Twins	x
Triplets	y

OPERATION (24-25)

Bags	x (over 25)
Accouchement force	y (over 25)
Packing vagina	00
Version	1
Potter's version	2
Secondary repair vag. outlet	3
Opening vulvo-vaginal abscess	4
Hysterectomy	5
Breech extraction	6
Induced abortion (drugs)	7
Induced abortion (instrum.)	8
Cleidotomy	9
Spontaneous delivery	10
Forceps, low	20
Forceps, mid.	30
Forceps, high	40
Scanzoni forceps	33
Deliv. of placenta	50
Cesarean section, classical	60
Cesarean section, Porro	61
Cesarean section, extra-uterine	62
Cesarean section, sterilizing pt.	65
Cesarean section, low incision	63
Cesarean section, vaginal	66
Cesarean section, post mort.	67
Emptying uterus manually	64
Craniotomy	70
Curettage	80
Opening breast abscess	90
Pubiotomy & spontaneous	11
Pubiotomy & low forceps	21
Pubiotomy & mid forceps	31
Pituitrin and spontaneous	12
Pituitrin & low forceps	22
Pituitrin and mid forceps	32
Pituitrin and version	52
Ritgen's Maneuver	13
Bougie and spontaneous	14
Castor oil and quinine	15
Laparotomy	97
Manual replacement retroverted uterus	98
Radium	99

ANAESTHETIC (26)

None	0
Gas oxygen	1
Morphine	2
Chloroform	3
Ether	4
Gas and chloroform	5
Gas and ether	7
Ethyl chloride (local)	9
Scopolamine	x
Chloral hydrate	y

PERINEAL CONDITION (27)

Intact	0
First degree laceration	1
Second degree laceration	2
Complete tear	3

Episiotomy	4
Old lacerations	5
Old lacerations complete	6
Ulcers	7
Old lacerations	x

DAYS IN BED (28-29)

PLACENTA (30)

Duncan	x	
Schultze	y	
Intact		0
Retained		1
Succenturiate		2
Veementous insertion of cord		3
Infarcts		4
Portions retained		5
Syphilitic		5
Single (twin cases)		7
Cotyledonous		8
Prolapsed		9

COMPLICATIONS (31-32)

Sepsis	x	
Ophthalmia	y	
Fractures, bones of child		00
Eclampsia		1
Placenta previa		2
Ablatio placenta		3
Abortion		4
Extrauterine pregnancy		5
Ruptured uterus		6
Postpartum hemorrhage		7
Mastitis		8
Phlebitis		9
Purpura		10
Eclampsia and placenta prev.		11
Fracture of pelvis		12
Toxemia		13
Cholecystitis		14
Floating kidney		15
Retention of urine, postpartum ..		16
Prolapsed cord		17
Cystocele		18
Cracked nipples		19
Threatened abortion		20
Pernicious vomiting		21
Hysteria		22
Mental derangement		23
Amniotic adhesions		24
Endometritis		25
Accephalic child		26
Anemia		27
Pruritus		28
Psoriasis		29
Bichloride poisoning		30
Backache		31
Abscess of labia		32
Cystitis		33
Pressure on bladder		34
Tongue tied		35
Cleft palate		36
Spina bifida		37
Hydrocephalus		38
Hemorrhoids		39
Pyelitis		40
Broncho-pneumonia		41
Convulsions (baby)		42
Scars of vulva from burns		43
Caked breasts		44
Polydactylism		45
Prolapsed arm		46
Torn urethra		47
Hydramnion		48

Hot water bottle burns	49
Hemorrhage from the cord	50
Retinitis	51
Anesthetic death	52
Minor deformities	53
Shock	54

CONDITION OF MOTHER (33)

Bad	1
Fair	2
Good	3
Died	4
Ununited lacerations	5

CONDITION OF CHILD (34)

Boy	x	
Girl	y	
Drowned		0
On discharge:		
Bad		1
Fair		2
Good		3
Abortion		4
Miscarriage		5
Still born		6
Died in first 14 days		7
Congenital heart disease		8
Hematoma of scalp		9

LENGTH OF CHILD IN CM. (35-36)

Premature	x
Postmature	y

ATTENDANT DISEASES (37-38)

Influenza	1
Malaria	2
Otitis media	3
Furuncles	4
Mumps	5
Tuberculosis	6
Fibroid	8
Condyloma	9
History of Syphilis	10
Pneumonia	11
Cancer of breast	12
Bronchitis	13
Patent urachus	14
Typhoid	15
Pleurisy	16
Amebic dysentery	17
Pericarditis	18
Polydactylism (see 45, col. 31-32) ..	19
Congenital goiter	20
Hernia	21
Appendicitis	22
Measles	23
Bell's paralysis	24
Enteritis	25
Fall	26
Husband has tabes	27
Psoriasis (also 29 col. 31-32)	28
Idiot or feeble minded	29
Exophthalmic goiter	30
Intestinal obstruction	31
Infected tooth	32
Scabies	33
Rheumatic pains	34
Rigor mortis	35
Burns	36
Exploratory laparotomy	37
Gonorrhoea	38
Hook worm	39
Tonsillitis	40
Bubo	41

Pellagra -----	42
Diabetes -----	43
Hypothyroidism -----	44
Whooping cough -----	45
Morphin poisoning -----	46
Epilepsy -----	47
Ovarian cyst -----	48
Trypanosomiasis -----	49
AUTOPSY (39-40)	
Broncho-pneumonia -----	1
Negative -----	2
Cerebral hemorrhage -----	3
Endocarditis -----	4
Syphilitic bone changes -----	5
Obstructed glottis -----	6
Hemorrhagic disease of new born -----	7
Enlarged spleen and liver -----	8
Enlarged thymus -----	9
Degeneration of liver -----	10

Palpable colon -----	6
Head and Chest (43) -----	
Normal -----	0
Headache -----	1
Tonsillitis -----	2

The technic of using the code is as follows: With the code at hand, the case histories are reviewed and a work sheet is made. (Fig. 1). Each line of the sheet represents a case. This grouping of cases often gives you unexpected information. One group of students may have more than their share of infections and investigation shows a break in technic. In going over our past records, I was struck with the number of still births a certain group

M.C.V. Obstetrical Histories, Coded

COLUMN	6	7-8	9-10	11	12	13	14	15	16	17	18	19-20	21-22	23	24-25	26	27	28-29	30	31-32	33	34	35-36	37-38	39-40	
Case No.	Color and Condition	Age	Children	Abortion	Heart	Lungs	Went	Blood Pressure	Urine	Fetus	Atresia	Total Duration	Duration of Stage	Prenatal	Operative	Anesthetic	Painful	Days in Bed	Flores	Complications	Cond. of Mother	Cond. of Child	Length of Child	Weight of Child	Abnormalities	Autopsy
1520	2	41	9	0	1	0	0	2	1	1	3	12	8	2	10	0	1	9	0		3	3	46			
1521	2	30	4	0	0	0	0	1	1	1	3	31		2	10	0	0	9	0		2	3	46			
1522	2	29									3	4	40	2	10	0	1	9	0		3	3	50			
1523	1	21	0	0	0	0				1	3	31	4	1	10	0	1	9	0		3	3	48			
1524	2	15	1	0	0	0				1	3	22	x	1	10	0	1	9	0		3	3	49			
1525	2	23	1	2	0	0	4	2		1	3	17	x	2	10	0	0	9	0		3	3	50			
1526	2	29	7	0	0	0	0	1		1	3	24	4	2	10	0	0	9	4		2	3	49			
1527	2	24	1	0	0	0	0	2	1	1	3	19	4	1	10	0	1	9	0		3	3	48			
1528	2	28	2	1	0	0	0	1		1	3	11	10	1	10	0	0	9	4		3	3	47			
1529	2	24	1	3	0	0	0	2		1	3	7	20	1	10	0	0	9	4	8	3	3	47			
1530	2	39	7	1						x	2			2	10	0	0	9	7	50	3	3	41			
1530	2	39	8	1						x	3			7	10	0					3	3	43			
1531	2	22	1	1	1	0	0	1		1	2	4	30		10	0	1	9	0		3	3	49			
1532	1	23	2	0	0	0	0	2		1	3	9	10	2	10	0	1	9	0		3	3	48			
1533	2	19	1	0	1	0	2	2		1	3	7	25	2	10	0	0	9	0		3	3	53			
1534	2	25	0	1	0	0	0	2	1	1	1	73	15	1	10	0	0	9	4	2	3	3	45			
1535	2	21	2	0	0	0	0	2		1	3	8	60	1	10	0	1	9	0		3	3	43			
1536	2	19	2	0	0	0				1	3	8	75		10	0	2	9	0	7	3	3	48			
1537	2	22	2	0	0	0	0	2	1	1	3	7	10	2	10	0	0	9	0		3	3	48			

POST PARTUM EXAMINATION

Vaginal (41)	
Anteflexed -----	x
Retroflexed -----	y
Cervix intact -----	
Lateral tear -----	
Bilateral tear -----	
Stellate tear -----	
Cystocele -----	
Rectocele -----	
Subinvolution -----	
Erosion -----	
Abdominal (42)	
Normal -----	
Flaccid -----	
Anal fissure -----	
Adenitis -----	
Enlarged liver -----	
Enlarged spleen -----	

Fig. 1.

had (six in twenty-three full term deliveries). These boys had no case to last more than ten hours and no second stage more than thirty minutes. On inquiry it was learned that these two men were accustomed to lighten their labors with pituitrin, but were afraid to put it on their histories. Habitual carelessness stands out glaringly on the work sheet.

The work sheets furnish the data from which the operator punches the cards. (Fig. 2). They should be preserved as a useful summary of the work and as a supplementary index. Suppose, for instance, you wished to look up a recent case and remembered it only by some un-

usual feature, say a kyphosis. It would be a simple matter to run down column seventeen on the last few work sheet and pick out "8," and save yourself the trouble of running all the cards through the sorting machine. The punched cards serve as the best possible index. Should you wish to study any complication or combination of complications, the cards will give the case numbers of these histories at the

of those with ruptured uterus, and two of the eclamptics. Thirteen, or sixty-five per cent, of the babies were lost.

A more suitable study is one that concerns the duration of labor. If it is desired to know the duration of labor according to parity, Table I furnishes the information, while the effect of the duration of labor upon fetal mortality is shown by Table II.

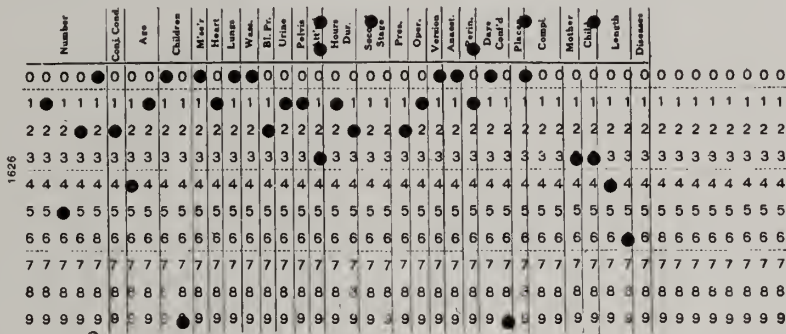


Fig. 2.

rate of one minute for every three hundred cards.

When the cards are punched, you have your material in the most workable form. It is only a question of a few minutes of machine work to sort out and count any phenomenon or combination of phenomena that you have on your cards. To illustrate, let us take some problem. I might say here that in common with all statistical methods, the plan and scope of the work must be carefully thought out in order to avoid glaring errors. If we wanted to know the effect of Cesarean section upon fetal mortality, our records would be worthless, not that there are no sections, for the series includes twenty such operations, varying in details from the classical operation to the post-mortem Cesarean section. The operators were the leading surgeons in Richmond, yet the fetal mortality was sixty-five per cent. It is hardly conceivable that even the poorest operator would have such a fetal mortality. The fault lies not with the operator nor with the operation, but with our selection of cases. The fetal mortality was due not to the method of delivery, but to the maternal complication for which the operation was done. One was done for pelvic indications, one on account of intestinal obstruction, two on account of ruptured uterus, three on account of placenta previa, three on account of uterine fibroids, four on account of toxemia, and five on account of eclampsia. Three mothers died, one

TABLE I. SHOWING THE DURATION OF LABOR ACCORDING TO PARITY.		
No. of Previous Children	No. of Cases	Average Duration of Labor.
Unknown	31	9 hrs.
None	256	20½ hrs.
One	110	13 hrs.
Two	66	14 hrs.
Three	57	11 hrs.
Four	32	12½ hrs.
Five	23	14½ hrs.
Six	17	17 hrs.
Seven	15	15 hrs.
Eight and over	28*	26 hrs.

*Includes one case 80 hours, one case 94 hours, and two cases over 99 hours.

TABLE II. SHOWING FETAL MORTALITY IN RELATION TO LABOR OF VARYING DURATION					
Duration Period (hrs.)	No. Cases	Still Born	Died in First 14 Days	Total Mortality	Percentage of Mortality
0-6	125	6	4	10	8.0%
7-12	204	17	3	20	9.8%
13-18	122	7	4	11	9.0%
19-24	66	5	2	7	10.6%
25-36	60	3	1	4	7.0%
37-48	23	3	1	4	17.4%
49-60	10	2	--	2	20.0%
61-72	11	5	--	5	45.5%
73-up	7	3	--	3	43.0%
Total	628	51	15	66	10.5%

While there is nothing particularly new in the information furnished by these tables, it is interesting to note in Table II how the numbers in column four, shifted over to the still born column as the duration of labor increased. What is especially interesting about these tables, however, is that the figures upon which they are based were furnished by the tabulating machine in sixty minutes from among 1,200 cards. In other words, the machine reviewed 1,200 cases, discarded those that did not supply the necessary information, separated the remainder into groups, and counted each group within one hour.

CONCLUSIONS.

Coding case histories is valuable; first because it causes a careful review of the history and therefore promotes better history taking, second because it puts the data in the most available and usable form.

1600 *Park Avenue*.

DISCUSSION.

DR. GEORGE T. MYERS, Norfolk: Dr. Rucker's paper is a step in the right direction. Relative to stillbirths, I think the classification of stillbirths, to a large extent, should be changed. The only thing is the still-birth. In eliminating any surgical condition we are confronted with too large a mortality for stillbirths. If a child is alive during pregnancy, unless the labor is unduly long, my contention is that, if that child is alive prior to the Cesarean operation, I do not see why it should not be delivered alive, unless the case has been neglected.

Statistics are often misleading. I am personally against statistics as a whole. Take the Cesarean section: I contend that it ought not to be done unless it is to save the living child; if other operations have been tried before and failed, then the operation is contra-indicated.

I say again that I think Dr. Rucker's paper is a step in the right direction.

DR. RUCKER, Richmond (closing): I have very little more to say upon the subject. In regard to the Cesarean section, there should be no fetal mortality attending the cesarean section. I merely brought this out to show the limitations of statistics.

Some people think you have proven something if you give a lot of statistics and quote a group of figures. You can readily see how someone inexperienced in statistics can dig out a group of cases and argue for or against the Cesarean section and convince some people.

THE USE OF QUINIDIN IN CARDIAC DISORDERS.

By J. MORRISON HUTCHESON, M. D., Richmond, Virginia.

From the rather extensive clinical testing to which quinidin has been subjected during the past few years it seems evident that the drug has a distinct field of usefulness in cardiac therapy. Its mode of action is not thoroughly

understood yet certain of its effects are quite constant and there is general agreement as to what cardiac conditions it is apt to influence favorably. Quinidin is not, however, a harmless drug and must be employed with the greatest care if its desirable effects are to be obtained and its dangers avoided.

Save for an occasional allusion to the tonic effect of quinin on the heart, the first reference to the clinical use of cinchona derivatives in heart disease was made by Wenckebach in 1914. His attention had been called by a patient to the effect of quinin on an irregularity known to be fibrillation and in this way he was led to try the drug in a number of similar cases. When his observations were published, the number of favorable results was so small as to attract little attention. Other investigators also obtained comparatively poor results with quinin, but the occasional effect of the drug on fibrillation led Frey to investigate the action of the other three alkaloids of cinchona, and in this way the remarkable properties of quinidin were discovered. Frey reported in 1918 that of 22 cases of fibrillation treated by him with quinidin, eleven regained normal rhythm, and, according to a number of other observers who have repeated his work, these figures indicate about the proportion of cases of fibrillation in which good results may be obtained.

The general effect of quinidin on the heart appears to be depressant, and is exerted directly upon the cardiac muscle. Excitability is diminished so that extrasystole or fibrillation cannot be produced artificially and conduction is lowered in auricle, ventricle and junctional tissues. Various types of block have been produced experimentally but these have rarely if ever been observed in the clinical use of the drug.

The manner in which quinidin acts on auricular fibrillation is still uncertain and is apt to remain so until the nature of fibrillation itself is better understood. According to Lewis and his co-workers, quinidin prolongs the refractory period in the auricle and delays the recovery of the tissue, thus shortening the gap between the crest and wake of the circulating wave and eventually abolishing it and allowing normal impulses to regain control. On the other hand, quinidin also depresses conduction in the auricular muscle, a condition which favors the re-entry of the excitation wave and lengthens the gap. It would seem, therefore,

that the results of quinidin therapy in a given case would depend upon which of these somewhat antagonistic effects predominates.

When quinidin is given to a patient with fibrillation, the first effect is a slowing of the auricular rate with larger and more regular P waves in the electrocardiogram, a condition approaching auricular flutter. This occurs in the majority of cases treated while in about half the cases the rhythm rapidly changes to normal. On the other hand, digitalis, which has been our main reliance in fibrillation, influences the rhythm little or not at all. Its good effects come from diminished conduction in the bundle of His, thus allowing fewer impulses to flow to the ventricle with consequent slowing of the ventricular rate.

Improvement after quinidin therapy comes as the result of restored normal rhythm, and is often most striking in those patients with fibrillation who are uncomfortably conscious of irregular heart action. Cardiac efficiency may also be favorably influenced by the removal of the additional burden of disordered rhythm, but the direct effects on decompensation which follow digitalis administration are not to be expected from quinidin.

Where normal rhythm has been restored by quinidin, it is usually necessary to continue the drug either in small daily doses or intermittently. The duration of the effect is variable, lasting from a few days to several months. Frey states that two-thirds of his cases maintained a normal rhythm for at least one month.

The dangers from quinidin in heart cases are considerable, and should constantly be borne in mind. Certain individuals appear to possess an idiosyncrasy for quinidin just as they do for quinin and alarming symptoms, such as sudden loss of consciousness with standstill of respiration, have been observed to follow even small quantities of the drug. It has, therefore, become customary to precede quinidin therapy by single test doses of 3 to 4 grains of the drug in order to ascertain whether or not any such hypersusceptibility exists. Toxic symptoms, such as giddiness, tinnitus, intestinal cramps, and urticaria invite caution, but are not as a rule of serious import. Marked weakness, precordial distress or increasing breathlessness indicate withdrawing the drug promptly. Increasing ventricular rate, unless it marks the advent of auricular flutter, should also be regarded as a danger signal.

In cases with auricular fibrillation a certain amount of clotting in the auricles is prone to take place, so when normal rhythm is resumed and the auricle contracts fully, these clots may be detached. To this extent, therefore, quinidin favors embolism, and several deaths from this cause have been reported during its use.

Up to the present time, clinical observations on quinidin have dealt chiefly with auricular fibrillation, though the drug has been also frequently used with good results in premature contractions and to prevent the seizures of paroxysmal tachycardia. In the latter conditions small doses have seemed to be effective and the dangers attending its use less than with fibrillation.

Auricular fibrillation occurs either as a transient affair lasting a few hours or a few days or, more commonly, as a permanent malady existing until death. Quinidin is much more effective in the transient than in the permanent type and all observers agree that the shorter the duration of the fibrillation the greater the likelihood of restoring normal rhythm. Where fibrillation is accompanied by definite signs of decompensation, digitalis should be the remedy chosen, as the depressing effect of quinidin on the heart muscle is likely to outweigh the possible benefits to be derived from changed rhythm. Where compensation has been restored, however, and the heart digitalized, quinidin may be used as the seemingly antagonistic action of the two drugs on the auricular muscle has not been apparent clinically.

Quinidin is generally administered in the form of the sulphate. Where no idiosyncrasy is shown to exist, the initial dosage may be three grains three times a day, and this may be rapidly but cautiously increased to as much as fifteen grains thrice daily. If untoward effects occur, or if normal rhythm develop, the drug must be stopped promptly.

The following case illustrates the method of using quinidin and the manner in which a favorable effect manifests itself:

A farmer, aged 30, was admitted to the hospital January 17, 1923. He complained of palpitation, especially at night, and shortness of breath on exertion, with slight swelling of the feet. There was a history of rheumatic fever in early life, and physical examination revealed typical mitral stenosis. The pulse was 90, irregular, and the electrocardiogram showed auricular fibrillation with left ventric-

ular preponderance. Digitalis had been given, but as no apparent effect had been produced it was continued in larger doses for several days. The pulse rate diminished somewhat, but the subjective symptoms continued, so quinidin was begun, giving three grains the first day and increasing the dose to six grains three times a day. At this point the heart rate rose to 130 but as the electrocardiogram revealed an impure flutter the same dose was maintained with the result that on the following day the rhythm was normal. There have been several recurrences of irregular heart action but these are easily controlled by a few three grain doses of quinidin and there has been no further necessity for digitalis. Subjective relief has been marked and, as the result of more orderly rhythm, the cardiac reserve appears to have improved.

It is difficult as yet to estimate the relative importance of quinidin among cardiac drugs. That it will cause the auricle to cease fibrillating has been clearly demonstrated and the clinical results of this change are often brilliant. It is also of value in the management of other disorders of rhythm of less significance. On the other hand it must be remembered that normal rhythm is restored in only 50 per cent of cases to whom quinidin is given according to our present technique of administration, and not all of these show clinical improvement. Wolferth estimates that only about half, or 25 per cent, of the whole number treated by quinidin gain appreciably in cardiac efficiency. These facts together with the dangers incident to the drug itself place certain definite limitations upon its usefulness.

When quinidin therapy is undertaken, it should be with a full knowledge of the condition to be treated and with ample facilities for thorough management and accurate observation of the patient. The classification of arrhythmia is often impossible without the aid of graphic studies, while changes from fibrillation to flutter can be detected only by the electrocardiograph. According to Lewis, "it is a treatment emphatically for the wards rather than for use in an outpatient department." With our present knowledge of the possibilities of quinidin, it should certainly be carefully considered in every case in which the auricles fibrillate, but used only after every contraindication has been eliminated and under the strictest supervision.

209 Professional Building.

TWO COMMON DISEASES IN CHILDREN OFTEN OVERLOOKED.*

By CHARLES E. CONRAD, M. D., Harrisonburg, Va.

I wish to direct your attention to two common conditions occurring in children which are often overlooked. Both occur frequently in the practice of every general practitioner and can easily be detected if looked for. The two I have in mind are acute otitis media and pyelitis. One point I wish to especially bring out in regard to acute otitis media is that you can have this condition existing and the drum almost ready to rupture, or it may go to the stage of rupturing without pain.

What I have to say is nothing new, but as I saw in an article appearing in the *Journal of the A. M. A.*, about encouraging breast feeding: "While we all realize it we must keep repeating it as the surgeons did appendicitis until every man not only knows it but puts it in practice."

Unless there is some direct symptom calling attention to the ears or kidneys, they are often overlooked. The diagnosis of many unaccounted for fevers in children will be cleared up and explained if the ears and urine are examined.

The chief point I wish to bring out and leave with you relative to acute otitis media is, as I stated before, that it can exist without pain, and the best way I know to show this is to give a few histories of it in children who are old enough to tell intelligently what hurts them.

D. Y., age five years. Mother called me on account of child having a fever. On examination, I found the child with a temperature of 103° F. She was not complaining in any way. Throat was normal, lungs normal to percussion and auscultation, heart normal, abdomen soft, not tender, no masses felt, no glandular enlargement, stools normal, urine normal, and, in fact, a complete negative examination except for one ear. The left drum was very red and inflamed but not bulging; right drum normal in appearance. Temperature ranged from 98.2° in the morning to 103.5° in the evening, until the fourth day when it went to 104°. At this time the right ear became involved. Fever from then on dropped by lysis, reaching normal in the afternoon of the tenth day. This child never showed any other complications

*Read at the meeting of the Medical Association of the Valley of Virginia, in Winchester, May 31, 1923.

during her illness, and at no time did she have any pain in either ear.

E. B., age seven years. In this case I was called on account of the child having fever but presenting no other symptoms. On examination, I found him with a temperature of 106° F. General physical examination was negative except both ear drums were very red and inflamed but neither drum bulging. He had not had any pain in either ear and when asked said they did not hurt him. I ordered some local treatment that night. The next morning, his mother said he had been delirious during the night and, as the drums were bulging, a paracentesis was done by Dr. E. R. Miller of Harrisonburg. There was a very free drainage of pus from both ears, and he never complained of pain except when ears were irrigated. Temperature dropped to normal in four days, and child made a complete recovery without any complications.

E. S., age twelve years. In this case. I found a boy, with temperature 104°, suffering with headache, severe pain in right shoulder joint and back of neck; on examination shoulder very sensitive to pressure and movement, some neck rigidity and pain on being flexed, moderate Kernig; his movements were somewhat jerky, physical examination otherwise negative. The above, with the history of having vomited the night before, made me somewhat suspicious of a meningitis, and I decided if he was not improved in the morning I would do a lumbar puncture. Much to my surprise, when I returned in the morning I found a very different picture. The boy had a normal temperature, looked very comfortable, no neck rigidity nor Kernig, and very little pain in shoulder, but what I did find was a freely discharging right ear which the mother told me had "broken" during the night. As it was in the middle of summer and a very hot spell. I had failed to look at the ear the night before, much to my embarrassment that morning. He had no further rise in temperature and recovered rapidly. At no time did he have any pain in his ear.

M. B., age twelve years. On March 16, child had pain in ear at night which subsided before morning. On 18th, Dr. J. E. Wine, of Harrisonburg, was called and obtained the above history with the addition that she had been well Saturday, the 17th, and had developed a fever that day (18th). When he saw her,

her temperature was 105°. Examination revealed negative physical findings except drum of right ear was red and inflamed but not bulging. She then began to run an irregular fever from 98.6° to 99° in morning, with chill and temperature from 103° to 105° in evening, going up to 106° on 22d. On 23rd, drum was bulging and paracentesis was performed by Dr. E. R. Miller. There was only a slight amount of thick drainage. After this, her temperature did not go above 103° until 27th when it reached 105° again. At this time she was seen by another physician and given calomel and laxatives with no result on temperature. She developed an acute rheumatic arthritis of right ankle joint April 1. I saw her in consultation April 2, physical findings were negative except rheumatic joint, as stated above, and a bulging right ear drum, with old incision healed except for a small opening at top of incision which was plugged with thick pus; temperature then was going to 105° in p. m. Some days she would have two chills with highest rise in temperature after second chill. Dr. Miller opened the drum on April 3, obtaining a thick plug of pus, at which time the child's condition looked desperate. After this, temperature did not go above 103°. On the 6th, Dr. Wine and I noticed what appeared to be a furuncle about inner one-third of the external auditory canal, and on April 8 we expressed quite a bit of pus out of the furuncle. When we first saw the furuncle there was a red line running from it to the drum which was quite apparent on the 8th. After this was opened and drained, her temperature never went above 100° and she only had chilly feeling but no real chill. By the 11th, she was free from fever, and discharge had stopped. From that time, she made an uneventful recovery. At no time did she have pain in the ear except for the one night at beginning, and this subsided before morning. This child was very septic and for several days we feared a fatal ending. The very interesting thing in her case was the very thick pus which would not drain from the opening in the drum and its burrowing under the skin, presenting itself as an apparent furuncle in the canal.

I will not go into detail as to pus in the urine, or what is called pyelitis, as much has been written and talked about it in the past few years. I only take it up to draw your attention to it again as a very frequent source of

unexplained fever in children. The fever is usually of a fluctuating type, and the child appears during an acute attack much more ill than the physical examination will account for. One symptom I do want to bring out, and that is the color of the child. If you will notice these cases carefully, you will find they often have a peculiar pearly-gray color. Another thing to remember is that a single negative urine examination is not sufficient to exclude pyelitis, for pus may be absent from the urine one day and the next day or a few days after pus may come down in showers.

Let us remember that acute otitis media can occur without pain and that no physical examination in a child is complete without looking at the throat and ears and, in an unexplained febrile condition or in a child who is apathetic and not doing well without a definite reason, be sure to examine the urine.

I fully realize this paper has nothing of scientific interest, but, dealing with two very common conditions met with in children, if it will gain closer observation from any one along this line, I feel it has been worth presenting.

DISCUSSION

DR. KENNETH BRADFORD, Staunton: The lesson brought out in this paper cannot be over estimated. It is very important to every practitioner. Even the title itself is a lesson: it convicts us of sins of omission. These diseases are common. The other lesson is that, as they are commonly overlooked, it behooves us to bear them in mind when general examination shows no cause for the temperature, especially during the dentition period and after and during any acute infection. In case of pyelitis, it is well to bear in mind the fact that it often occurs in connection with gastro-intestinal infections, especially infectious diarrhoeas. Another important point is that in a case of infectious diarrhoea, if the diapers are not properly disinfected, they will very likely infect the patient through the urethra and give rise to a case of pyelitis. It is so common as to be axiomatic that when you have fever in a young child with no apparent cause you usually have either otitis media, pyelitis, or pneumonia, the last of which can, of course, be differentiated very soon.

DR. J. E. LINCOLN, Lacey Spring: Could you state absolutely that the case had no previous evidence of scarlet fever?

DR. CONRAD: Yes.

DR. C. P. HARSHBARGER, Port Republic: I feel that I want to say a few words in substantiation of what Dr. Conrad has said as to diagnosis of pyelitis in children, especially small children. I had a case last winter and called Dr. Conrad in consultation. It proved to be influenza with a tendency to pneumonia.

After seeing it several times I found a temperature which I could not explain by the symptoms on auscultation and percussion. After the child was apparently well of the influenza, she was still sick with pyelitis. Until that time I had had difficulty in getting a specimen of urine. The first specimen showed pus and blood. Many of these children get sick, especially in cross roads country, and are all seen by the general practitioner. That is why it is important for us to make an early diagnosis.

A few years ago I was called to see a lady who had, as I thought, symptoms of appendicitis, tenderness at McBurney's point, high temperature, chill, and I made an error in diagnosing this case. The symptoms were so prominent that it looked like operation. I called in Dr. Deyerle. After going very thoroughly into the case he found pyelitis.

Soon after that I was called to see a child with very moderate symptoms, not definite as to exact cause. The child was three years old. It turned out to be a clear case of pyelitis.

In my early years of practice I overlooked many cases of pyelitis. Now there are very few that I overlook on account of experience. A few months ago I was called to see a patient, and as soon as I saw her in this attack I suspected pyelitis. She had had a spell exactly like this in the winter and a prominent physician had said that she had appendicitis. I got a specimen of urine and found that it was loaded with pus. There was pain over McBurney's point, which was the symptom in the winter. She had pain over the urethra and over the back at this time. A few days after that she came up for life insurance examination. The symptoms had then subsided, but the specimen was still loaded with pus. There was another case in which the physician had made the same mistake of diagnosing appendicitis.

We cannot lay too much importance on the urinary examination in all cases of little children with temperature without apparent cause.

DR. H. G. MIDDLEKAUFF, Weyers Cave: A family of five children had influenza about the middle of January. Apparently all got well. In May, one child became sick and I saw it with a high temperature, no other symptom. The ears showed nothing. I gave castor oil and the next day he was well. A couple of days later another child did the same thing. The parents gave calomel and he got well without my seeing him. Another child did the same thing. In a few more days the baby got sick. The only way this child complained was just to lie still all day. (It had been a very active baby). If you lifted it up it did not raise its head. No diagnosis had been made in the other children. This child had peculiar symptoms, and the family was alarmed. The first day I saw it the ears were apparently normal. The child just presented the symptoms of lassitude and slight temperature. The next day the ear drums showed redness, and there was some slight glandular enlargement of the neck. With local treatment it cleared up. In a few days he presented the same symptoms again, but cleared up readily. He has apparently recovered.

All these cases go to prove that there may be otitis media without pain.

DR. CONRAD, *closing*: I have noticed this year with small children a rather large tendency to pyelitis after influenza, in which they continue to have an unaccountable temperature.

AN UNUSUAL ACCIDENT DURING DELIVERY AT TERM.

Report of a Case.*

By B. H. MARTIN, M. D.,
and
ARTHUR S. BRINKLEY, M. D.,
Richmond, Va.

NAME: Mrs. C. A. N.; white female; age 24; married. Occupation, housewife.

PAST HISTORY: Usual diseases of childhood; operated on for appendicitis five years ago, otherwise negative.

FAMILY HISTORY: Negative for cancer; one sister died of tuberculosis.

MENSTRUAL HISTORY: Menstruation started at 14 years of age; always regular; duration four to five days, with normal flow. Last menses February 15, 1922.

MARITAL HISTORY: Married 1915; three pregnancies before this one, all boys, fully developed, and delivery normal, now living and well; no miscarriages. Husband's health excellent.

GENITO-URINARY: No unusual vaginal discharge; no venereal sores; some nocturia during pregnancies, has to get up once or twice during night, no pain on urination.

CARDIO-RESPIRATORY: Negative except complained of difficulty in breathing on admission to hospital; pulse rate 90; volume fair.

GASTRO-INTESTINAL: Appetite good; constipation occasionally, otherwise negative.

PRESENT ILLNESS The patient menstruated last on February 15, 1922. She had been seen at regular intervals during parturition by Dr. Martin. Nothing unusual was noted—apparently normal pregnancy. She started in labor about ten A. M., November 8, 1922—occasional pains. She was seen by Dr. Martin at noon; he made an examination, and thought very probably it was a breech presentation. Dilatation of cervix at this time was about two inches in diameter—occasional pains. He left the patient in charge of an attendant and returned early in the evening, intending to give chloroform and deliver her. On a second examination he found that he was dealing with a face presentation. The cervix was fully dilated, and labor pains were about five minutes apart. At 9:45 P. M. she was given a little chloroform by inhalation, and five minims of pituitrin by hypodermic. She had a very severe pain soon after administration of pitui-

trin, and several slight pains for the next thirty or forty minutes. There was a moderate flow of dark blood coming from the vagina. Finding that the oncoming head had made no advancement, he washed up to do a version. The chin seemed to be locked behind the pubis. On introducing the hand, he found the baby was out of the uterine cavity, and his hand was in the abdomen. A version was quickly done, and a dead child delivered. Very little bleeding followed delivery. The hand was introduced again, and this time it entered the uterine cavity, and the placenta was easily delivered. On further examination he found that the vaginal vault was almost completely torn away from its attachment to cervix, only a small bridge of tissue holding posteriorly. He packed the vagina with sterile gauze, and called Dr. Brinkley over the 'phone. At this time, 10:40 P. M., the patient was lying quietly in bed, and, with the exception of being a little pale, showed no evidence of shock or severe hemorrhage—pulse 80 to 85, and very good volume. She, however, complained of rather severe pain in both iliac regions, radiating in her hips, and down her thighs; also some difficulty in breathing when deep inspirations were taken. With sterile vaginal retractors, the vagina was inspected to see how much bleeding there was, and also to get a better idea of the condition we were dealing with. There was a good deal of oozing from the torn surfaces, so the vagina was packed tightly with sterile gauze, and the patient sent to The Retreat Hospital in an ambulance, and operated on immediately by Dr. Brinkley.

Under gas, oxygen, ether anesthesia, an incision was made for pelvic work, extending from the umbilicus to the pubis, and about one inch to the right of the median line. On opening the peritoneal cavity, a small amount of free blood was revealed, and also some large clots in the torn part of both broad ligaments. The uterus was well contracted, and there was no evidence of a rupture in the uterus. The clots and free blood were quickly removed, and the uterus was found to be suspended only by the tubes on either side and a small bridge of the vaginal attachment posteriorly, which was about one and a half inches wide. Both broad ligaments were lacerated up to the pelvic brim on either side, and the tear on the right side extended through the vaginal wall

*Read at a meeting of the Richmond Surgical Society, February 6, 1923.

practically to the vulva. The uterine arteries were as cleanly dissected out as if some one had done a careful dissection, but were not torn away from the uterus at the main point of entry. They were pulsing, and the small branches had stopped bleeding. The uterines were quickly clamped and severed between the clamps. The left tube and ovary were markedly injured, and the blood supply practically cut off, so it was thought best to remove the left tube and ovary with the uterus. The broad ligament on this side was doubly clamped and severed between the clamps. The right tube and ovary seemed to have a pretty good blood supply, so they were not removed. The broad ligament and tube were doubly clamped close to the fundus of the uterus, and severed between. The only attachment left was the small bridge of tissue at the posterior cervico-vaginal junction. This was clamped off, and the entire uterus, with left tube and ovary attached, was removed. The vagina was then repaired, starting at the lowest angle, and suturing it over with a whipped suture of No. 1 tanned catgut. The uterine arteries were then doubly ligated; the ovarian arteries were doubly ligated, and the vagina was then closed with a purse-string suture of No. 1 tanned catgut, reinforced with several interrupted mattress sutures of the same material. A cigarette drain was inserted in the vagina before the purse-string suture was tied; the stump of the right broad ligament and tube was fixed to the vaginal vault for support. The peritoneal reflection of the bladder, which had been torn away from the anterior surface of the uterus, was then used to help cover over the raw surface. Both broad ligaments were whipped over, and all the raw surface was completely covered with peritoneum. The cul-de-sac was then carefully sponged out with saline sheets, and about three quarts of normal saline poured into the abdominal cavity. The appendix had been removed at a previous operation.

The wound was then closed in the following manner: A continuous mattress suture of No. 1 tanned catgut in the peritoneum; a lock suture of the same in the muscle; a lock suture of the same in the fascia, reinforced with six interrupted mattress sutures of the same material. Eight silkwormgut interrupted sutures were then inserted in the skin to include the fascia, and the ends were clamped to be tied later. The skin was then closed with a mat-

tress suture of No. 1 tanned catgut. The silkwormgut sutures were tied over a roll of iodoform gauze, and a sterile dressing and bandage were applied. A retention catheter was then inserted, in order that the bladder could not become distended with urine. The patient left the table in fair shape; pulse around 120, and volume fair, considering the amount of blood she had lost.

POST OPERATIVE ORDERS: Flat in bed; hypodermoclysis 500 c.c. stat., and 50 c.c. q. 4 h.; continuous rectal saline, glucose, and soda, gravity method—saline pts. 1, glucose oz. 1, soda drs. 2; caffein-sodio-benzoate grs. 2, q. 6 h. hypo.; digalen min. 15 hypo. Q. 6 h., alternating so as to get stimulation every three hours; morphine grs. 1/6 q. 4 h. S. O. S.; water freely.

GROSS PATHOLOGY: The specimen consists of an uterus about the size of a small infant's head, with left tube and ovary attached. It is well contracted, and there is no tear in the uterine wall or in the cervix. The uterus is now incised to see if there is any pathology on the inside. The interior of the uterus is clean, with no evidence of placenta or membranes. There is no laceration in the uterine wall.

November 9th, second day after operation, the patient had a fair night only, complained of air hunger at times; pulse good; volume ranging from 112, just after returning from operating room, down to 88 at 8:00 o'clock A. M.; temperature 100; respiration 22; moderate amount of drainage from vagina, tinged with blood. Blood count: Reds 2,696,000, whites 15,000, polys 85%, lymphocytes 15%, hemoglobin 55%. Urinalysis: Color, amber; turbidity, very cloudy; reaction, acid; specific gravity, 1032; albumen, large trace; acetone, slight trace; blood corpuscles, few; pus cells, occasional; crystals, abundant amorphous urates; casts, few hyaline and rare granular; epithelia, few.

November 10th, third day after operation, uncomfortable night, complained of severe pain at times in lower abdomen and hips, moderate amount of distention, highest temperature 101.4, pulse 96, respiration 24, taking water freely and expelling gas back in proctoclysis can. Sherman's vaccine No. 35 was ordered, starting with 1/2 c.c. hypo. first day, increasing to 1 c.c. daily. Mammary glands were very tense and painful; belladonna ointment and bandage applied; wound inspected, healing

nicely; liquids, except milk, every 2 hours ordered.

November 12th, fifth day after operation, patient had a fairly comfortable night; temperature went to 102 during night, pulse 100, respiration 24; expelling a large quantity of gas and feces through proctoclysis can; moderate quantity of thick, bloody looking vaginal discharge, excreting a fair quantity of urine; nauseated once or twice during night, and vomited a little light green fluid early in A. M. She was given a pint of hot soda water; it was vomited back immediately, and she felt better. Two hours later compound licorice powder drs. 3 was given, followed in four hours with S. S. enema, which returned clear. Two hours later she had a very large dark brown stool. Bowels moved three times after this, abdomen soft, and patient fairly comfortable. Proctoclysis discontinued. Blood count: Whites 16,000, polys 90, lymphocytes 10, hemoglobin 60. Urinalysis: Color, orange; turbidity, hazy; reaction, acid; specific gravity, 1025; albumen, large trace; acetone, heavy trace; blood corpuscles, few; pus cells, numerous; crystals, triple phosphate; casts, negative; sediment, moderate amount. Bicarbonate of soda, dr. 1, t.i.d., and sweetened drinks q. 2 h., were ordered.

November 14th, seventh day after operation, patient had a rather uncomfortable night; complained of severe pain at times in lower abdomen; scanty vaginal drainage; highest temperature 100, pulse 92, respiration 22. Later on in the day the cigarette drain in the vagina was loosened up; this was followed by a marked increase in vaginal drainage, with small pieces of sloughing tissue. Feeling very much better; wound dressed, healing nicely; modified soft diet ordered.

November 16th, ninth day after operation, had a very comfortable night. Later on in the day she began to have an uncomfortable feeling in the region of the bladder. Catheter removed, and found to be stopped up with sediment; another inserted, and about 18 oz. of urine drawn off, and bladder irrigated with warm boric acid solution, and two drs. of 10% argyrol injected. Catheter removed and patient voided normally during day; very comfortable after catheter was removed. Highest temperature 99.4, pulse 96, respiration 20; moderate amount of serous vaginal discharge;

blood urea, 25 mg. per 100 c.c.; urea nitrogen, 12.5 mg. per 100 c.c.; Wassermann, negative. Urinalysis: Color, straw; turbidity, very cloudy; reaction, strongly alkaline; specific gravity, 1020; albumen, trace; acetone and diacetic acid, negative; blood corpuscles, occasional; pus corpuscles, occasional; crystals, few triple phosphate; casts, negative; sediment, large amount. Acid sodium phosphate grs. 10 with urotropin grs. 7½ in large glass of water was ordered given every four hours. Bicarbonate of soda discontinued.

November 20th, thirteenth day after operation, patient has been very comfortable for past few days. Temperature has been normal since November 16th; pulse today 88. Expelled cigarette drain from vagina; small amount of vaginal discharge. Wound dressed, no evidence of infection; healing nicely.

November 23rd, sixteenth day after operation, the patient has been doing well. Normal temperature, pulse 90. Sutures removed, no evidence of infection. A little straw colored serum oozed out of one of the stitch holes about middle of the wound; very little vaginal drainage. Blood count: Reds 2,976,000, hemoglobin 50, whites 7,000, polys 80, lymphocytes 20. A urinalysis showed the following: Color, amber; reaction, acid; specific gravity, 1020; albumen, trace; acetone and diacetic acid, negative; casts, negative; blood and pus corpuscles, a few; sediment, slight.

The patient had an uneventful recovery from now on. Allowed to sit up on November 30th, twenty-third day after operation, and left for home December 4th, twenty-seven days after operation, feeling very good. January 9th, 1923, the patient reported for examination. The abdominal wound had healed by primary union. With a bivalve vaginal speculum the vault of the vagina was inspected and found entirely healed. She was looking well and had no complaint.

REPORT OF UNUSUAL CASE OF MASTOIDITIS.*

By L. LEROY JONES, M. D., Portsmouth, Va.

Irving M., aged 5 years, had been suffering with acute sore throat, before I saw him on January 28th, in consultation with Dr. E. H. Claud. There was no previous medical history that had any particular bearing on his

*Read before the Virginia Society of Oto-Laryngology and Ophthalmology, in Richmond, April 18, 1923.

present illness other than an earache and rising in the left ear, one year ago. Examination of his ears at this time, showed the left ear normal and slight redness and bulging of the right ear drum. An opening of the ear drum was advised. The parents having been told that the child's tonsils and adenoids should be removed, desired that a general anaesthetic be given and all three be done at the same time, as they did not want the child hurt. After a thorough physical examination it was decided there was no contraindication to this procedure, so patient was taken to the hospital and given ether, tonsils and adenoids removed, and a wide and deep myringotomy performed. There were no complications. The patient was taken home the following day, ear discharging freely, and no pain.

Patient was seen in my office two days later, his condition being exceedingly satisfactory, with the usual amount of discharge from his ear that we ordinarily see from acute otitis media. There was no pain or temperature. The patient continued to be perfectly comfortable; but when he returned to my office on the eighth day after his operation there was a slight purulent discharge from his ear, with very little tenderness over the tip and antrum on deep pressure. There was no sagging on the posterior wall of the canal. An X-ray was advised and taken of the mastoid at this time, which showed the following: Both right and left sides showed marked density and cloudiness throughout the process with complete loss of cell definition. No portion of either process appeared pneumatic. It appeared to be a chronic sclerotic process on both sides, with possibly some active infection.

The child having had a history of similiar infection in the opposite ear one year previous, and the X-ray showing apparently the same pathology in both, I did not advise operation, but observation and local treatment. Patient was seen by me daily in my office for another week, at which time the ear had ceased to discharge and the drum appeared normal; hearing normal. No discomfort, no temperature or evidence of ill health.

On March 3rd the patient was sent to me from Dr. Claud's office with the following history: No discharge from the ear or any sign or symptom of ill health, other than a slight cold, since he was last seen by me. Child had

been playing around the house as usual and for the first time a swelling behind the right ear was noticed this morning. An examination of the patient's ears revealed the following: Left ear, negative; right ear, no discharge; drum appeared normal; no sagging of the posterior wall of the canal. Behind the ear there was a swelling and tenderness over the entire mastoid area, and looked as if there might be pus in a small area directly over the antrum. I advised that the child be taken to the hospital for mastoid operation. Ether was given and, on exploring the mastoid, it was observed that the whole mastoid area was of a purplish color and appeared to be spongy and necrosed. There were two small eroded areas about 1 cm. in diameter, one being over the tip and the other over the antrum. From this area I began to scoop out with the curette necrosed bone, pus and granulation tissue. No chiseling was necessary. The mastoid cavity proved to be totally destroyed. The destruction and the copious amount of pus and granulation tissue reached up to the dura, which was exposed over an area adjacent to the upper portion of the tympanic ring. The dura appeared to be thickened and hard. The sinus was exposed to the extent of $1\frac{1}{2}$ inches and found to be literally swimming in pus and granulation. The wall of the sinus was hard and indurated, pale blue in color. Pulsation could not be detected. The simple mastoid operation having been practically completed, and contemplating opening the sinus to determine definitely whether or not there was a thrombosis, also contemplating a jugular operation, I was informed by my anaesthetist and the family physician that the patient seemed to be in very poor condition, for further operative measures, and it was thought wise, both by Dr. Claud and myself to defer the opening of the lateral sinus for 24 hours. So the wound was closed with one stitch, with a rubber tube drainage and a light gauze packing. The pathological findings were explained in detail to the parents, immediately after the operation, and also the fact that other operative measures of a more serious nature would probably have to be resorted to the following day, the prognosis being probably unfavorable. The following day, March 4th, the patient's temperature remained normal and, when seen by me, was sitting up in bed playing with toys and with the exception

of a temperature of 99.3 on the third day after operation, which an enema relieved, his temperature remained normal. He was discharged, entirely well, on the sixth day of April, without ever having his lateral sinus operated upon.

The case is of unusual interest to me, in that we have here an extensive and total infection of the right mastoid, including a perisinus and epidural abscess and lateral sinus thrombosis, with such an atypical history—no pain, temperature or discomfort, either before or after operation. There was no discharge from the ear for over two weeks before the operation, during which time the child appeared perfectly well in every detail, and during which time very extensive destructive changes were taking place. How can any organism be virulent enough to give these destructive changes and at the same time not be virulent enough to give any other symptoms, such as elevation of temperature and some evidence of discomfort, or at least, ill health. I think that this patient unquestionably had a thrombosed lateral sinus, because on inspection the walls appeared diseased and thickened and on palpation the vessel was hard and no pulsation could be detected. The infection being of a low virulence, the thrombosis became organized and the collateral circulation became established sufficiently to take care of the obstruction.

This case was a lesson to me, in that we should be extremely cautious in our prognosis, even when most extensive pathological changes are found. The parents of this child were led to believe by me that the child was seriously ill and at the same time there was no evidence of it as far as their observation was concerned, either before or after the operation.

Professional Building.

INSULIN TREATMENT OF DIABETES.*

By J. D. WILLIS, M. D., Roanoke, Va.

The discovery of an effective extract of the internal secretion of the pancreas by Dr. F. G. Banting and collaborators, at the University of Toronto, has proven to be an epoch-making event in the diabetic world.

Dr. Banting first conceived the idea of preparing a potent extract from the atrophied pancreas while assisting in physiology at the Western University Medical College, London.

He came to Toronto and, by arrangement with those in charge of the Department of Physiology of the University of Toronto, began, May 17, 1921, an attempt to obtain the pancreatic extract by a new procedure.

His first work was done in collaboration with C. H. Best and conducted in the Department of Physiology at the University of Toronto under the direction of Professor J. J. R. MacLeod. He also received the aid and support of Professor V. E. Henderson of the Department of Pharmacology, on whose staff Banting held an appointment. The clinical application was made with the assistance of W. R. Campbell and A. A. Fletcher, in the clinic of Professor Duncan Graham in the Toronto General Hospital and in other institutions. Through the support of the Connaught Laboratories, under the direction of Professor J. G. Fitzgerald and Professor R. DeFries, facilities were obtained for the first small production of insulin, for clinical trials, prepared by a method elaborated by C. H. Best and J. B. Collip. The basis for this work was the appreciation by Banting that, upon ligation of the pancreatic ducts, there develop degenerative changes in the acini of the pancreas but not in the islet tissue. This observation was taken advantage of in the preparation of an active extract of islet tissue. Further experiments proved that trypsinogen and its derivatives were antagonistic to the internal secretion of the pancreas, and the failures of other investigators were thus accounted for.

The first pancreatic extract used by these investigators was obtained from the atrophied pancreas of the dog after the pancreatic ducts had been ligated for a period of ten weeks. The atrophied pancreas immediately upon removal was extracted in ice-cold Ringer's solution and then purified. It was found that this extract injected into diabetic dogs invariably reduced the percentage of sugar in the blood and in the urine.

Next, taking advantage of an observation that no enzymes were found in the fetal calf pancreas until after the fifth month, the pancreas from fetal calves was extracted in Ringer's solution and, after purification, injected into diabetic dogs, causing definite reduction in blood and urinary sugar.

Finally, a potent extract of islet tissue was obtained from adult beeves' pancreas by ab-

*Read at meeting of Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

stracting with 95% alcohol immediately after the death of the animal. The resin-like residue obtained by this process was re-dissolved in saline and injected subcutaneously into a diabetic dog, with the result that the percentage of blood sugar fell from .35 to .08 in three hours, and the urine became sugar-free. This was repeated with similar results. An extract, which could be kept sterile, had thus been obtained from the whole gland of the adult beef. The administration of this extract prolonged the life of totally depancreatized dogs from 19 to 70 days.

The next step in experimentation was the use of a potent, soluble, protein-free extract of the adult beef pancreas in the treatment of seven cases of diabetes mellitus. It was found that, in the human cases, following injection of insulin, there was a fall in blood sugar and a rise in respiratory quotient, indicating carbohydrate utilization. Patients reported complete relief from the subjective symptoms of the disease. By continuing injections of the extract the blood sugar would become normal if the dosage was adequate and ketonuria was abolished.

As a tentative basis for the physiological assay of insulin one unit is considered as the amount necessary to cause the blood sugar of normal rabbits weighing one kilogram to fall to .045% within four hours. This dose is decidedly active in lowering blood sugar in diabetic patients and is estimated to make possible the patient's utilization of one to four grams of carbohydrates.

Insulin now available for treatment is in strengths of five, ten and twenty units per cc. The remarkable lowering of blood sugar by insulin makes it necessary that extreme caution be taken in its administration. Generally speaking it is best to give insulin fifteen to thirty minutes before a meal, either once, twice or three times daily, according to the severity of the disease. Frequent blood sugar estimations must be made, in order to intelligently control the dosage. There is great danger in reducing the blood sugar below the low normal of .08%. The outward manifestations of lowered blood sugar below normal are weakness, nervousness and sweating. At this stage immediate consumption of sugar in the form of oranges, corn syrup, or candy affords ready relief. If the reduction in blood sugar should be as low as .045%, there will develop a state

of coma and convulsions. Glucose solution intravenously is necessary should such a serious state develop.

Insulin is an adjunct to the dietary treatment of diabetes, and the success in this treatment is largely dependent upon the intelligence and cooperation of the patient in carrying out dietetic instructions. A minimum supporting diet, low in carbohydrates, should be taken as a diet basis to work from. When the blood sugar of the patient reaches normal limits there should be a gradual increase in diet up to the caloric requirements of the individual. The well-known Joslin outline of diet is well adapted to this increase.

The insulin dosage will have to be increased or decreased, as determined by blood sugar estimations. It is desirable to use as little insulin as possible after the blood sugar has reached normal. It is possible in many cases to discontinue insulin very soon after blood sugar becomes normal. A sudden drop in blood sugar from a rather high concentration to normal is often seen. This is a dangerous period because of the likelihood of carrying the reduction below normal. This sudden drop in blood sugar is believed to indicate the resumption of function of the islet tissue of the pancreas, either wholly or in part. Stengall states that there is just as much reason to believe that a sick pancreas may recover by rest as a sick kidney.

Today I wish to give you my experience with five cases treated with insulin.

"Mrs. R. K. B." Age 35. Known to have had diabetes for the past two years. Weight: Two years ago, 165; one year ago, when I first saw her, 117. At that time she showed 2.22% sugar in 24-hour specimen of urine, with a trace of acetone and diacetic acid. She entered the Shenandoah Hospital and was treated for two weeks by the Joslin dietetic method. At the end of two weeks she was discharged on a diet consisting of 85 grams carbohydrates, 50 grams proteins, and 85 grams fat, totalling 1,300 calories per day. This diet was sufficient to maintain her weight at about 110 pounds, sugar-free except for an occasional spill-over.

At the time of starting insulin treatment, February 27, 1923, her weight was 106 $\frac{3}{4}$. Twenty-four-hour urine specimen showed 3 $\frac{1}{2}$ % sugar, and there was a good trace of acetone and diacetic acid. Blood sugar was

.23%. She was put on approximately a 1,000 calory diet consisting of 40 grams carbohydrates, 30 grams proteins, and 80 grams fats. She was given five units of insulin hypodermatically 15 minutes before each meal for two days. It was then increased to ten units before each meal. The fourth day the blood sugar reached .16%, and on the ninth day it reached .11%. At this time the urine sugar was a mere trace, and on the eleventh day there was no sugar in the urine and the blood sugar was .08%. She had gained two pounds in weight. She was discharged at the end of two weeks with a diet of 1,200 calories and had gained from 106 $\frac{3}{4}$ to 109. Two weeks later her weight was 115; urine sugar-free; blood sugar .07%.

This patient was entirely relieved of all subjective symptoms and was able to resume her normal activities, which she had been unable to do for two years. At the present time she is holding her weight around 115, sugar-free, on a calory diet of 1,500. She is now taking ten units of insulin before breakfast and before supper.

"Mr. J. W. D." Age 66. Has known that he had diabetes for the past two years. Complained of excessive thirst and polyuria. He ate ravenously, would drink four glasses of fluids during the meal, and get up soon to drink more. He averaged getting up once each hour at night to void. His blood sugar was .26% and urine sugar 6 $\frac{1}{2}$ %.

Insulin treatment started March 6th; ten units 15 minutes before each meal. Diet consisted of carbohydrates 40 grams, proteins 30 grams, fats 85 grams. Calories 1,000. The second day after starting treatment the excessive thirst was relieved, he voided three times at night, and within three days' time he said he felt like a different individual. All the depression and other subjective symptoms of the disease had disappeared. At the end of one week the blood sugar was .08% and urine sugar negative. He was discharged from the hospital on the eighth day, his weight 214 pounds.

Insulin was continued with this man, ten units before breakfast and before supper for one week. At the end of this time the blood sugar was .07% and urine sugar negative. Ten units of insulin were continued before breakfast for another week and at that time the blood sugar was .08% and urine sugar

negative. His weight remained 214. At this time the insulin was discontinued and diet continued which provided 1,800 calories, consisting of carbohydrates 60 grams, proteins 80 grams, fats 130 grams.

He has continued up to the present time on this diet and has retained his weight with no increase in blood sugar above normal, no return of glycosuria, and no return of the subjective symptoms.

"Mrs. A. O. S." Age 39. Weight 72 pounds. This patient had moderate thirst and an acetone odor to the breath. Blood sugar .21%. Sugar in the urine 8 $\frac{1}{2}$ %. She was known to have had diabetes for the past two years. Insulin treatment started March 20th. She was given 15 units 15 minutes before each meal and a 1,000 calory diet consisting of carbohydrates 40 grams, proteins 30 grams, and fats 80 grams. On the eighth day the blood sugar reached .06% and the urine sugar was negative. She was discharged from the hospital at the end of two weeks and had gained six pounds. She has continued the insulin and now takes ten units before breakfast and before supper. She now weighs 86 pounds. All subjective symptoms of the disease have disappeared.

"Mr. S. B. C." Age 63. Was brought in as an emergency with shortness of breath, which was thought to be a state of acidosis. He had had a large carbuncle on the back of neck for one week. Upon examination it was found that he had a badly decompensated heart, and the shortness of breath was largely resulting from this complication. The blood sugar was .32% and urine sugar 4%. This man was given 15 units of insulin every three hours for three doses, then every six hours. He died thirty hours after being brought to the hospital from myocardial decompensation of the heart. At no time did he develop a tendency to coma. This patient had had diabetes for the past seven years.

"Mr. J. A. S." Aged 70. Rather emaciated. Was in a state of extreme drowsiness at the time I saw him in consultation. By the time he could be transported to the Shenandoah Hospital he was more comatose and soon become decidedly comatose. Blood sugar was .30% and urine sugar 7%. He was given 15 units of insulin every two hours for four doses then every six hours. At the end of 12 hours there was decided clearing of mentality.

By the second day all signs of coma had disappeared. There developed a profuse expectoration of slate colored offensive material, which was evidence of a gangrenous lung area. By the third day the blood sugar was .08% and urine sugar negative. He was by this time on a 600 calory diet consisting of 10 grams of carbohydrates, 60 grams of proteins, and 40 grams of fats. Patient continued to improve with lessened expectoration. On the sixth day he suddenly died with what was thought to be cerebral embolus.

A FEW POINTS ABOUT THE ACUTE ABDOMEN.*

By W. DENNIS KENDIG, M. D., Kenbridge, Va.

The diagnosis of the diseases of the abdomen presents many difficulties. Those of a sub-acute or chronic nature are easier of diagnosis because there is sufficient time to make an exhaustive examination. Acute conditions of the abdomen may demand immediate attention, and for this reason the course of treatment should be early determined upon. The first step is to make a diagnosis. If a diagnosis is made, then the nature of the disease will determine what is best to be done. Some cases, however, on account of indefinite diagnostic symptoms and lack of time, baffle the most astute diagnostician. Such cases, in many instances, while not presenting a definite diagnostic picture, show positive signs of some serious acute condition within the abdomen. This has been called the acute abdomen.

The examination of such cases includes a painstaking history, a careful physical examination, a complete urinalysis, a full blood count, and such other diagnostic procedure as may be indicated and the circumstances will permit.

The most important symptom is pain. At times pain may be so characteristic in its location, severity, and character that the nature of treatment can be determined on this one point alone. Pain is the physician's and surgeon's greatest aid in bringing the case to operation. In the absence of pain it is hard at times for the laity to appreciate the importance of operation, even when recommended by competent men. I wish to advise against the early use of morphia in these cases, especially before a diagnosis is made, unless absolutely

necessary. It interferes with the diagnosis and sometimes causes a delay in getting patient's consent to surgical treatment. It is needless for me to say in acute abdominal pain never to give cathartics, but use enemas. An abdominal pain, not relieved by an enema, or certainly an enema and washing out of stomach, is generally a surgical case, and needs careful watching. In the examination of a case, the facial expression is very important, as sometimes the record sheets may show that probably the patient is improving, yet there is about him that unexplainable expression that indicates he is fatally sick. This has been called the "peritoneal face." Other important general symptoms are posture, character of pulse, fever, tumors, abdominal distention, tenderness, rigidity, condition of the skin, nausea, constipation, or diarrhoea, vomiting and hemorrhage.

The diseases which may cause the acute abdomen are appendicitis, acute cholecystitis, perforated gastric or duodenal ulcer, acute intestinal obstruction, ectopic pregnancy, strangulated hernia, acute salpingitis, acute pancreatitis, mesenteric thrombosis, and twisted pedicle of an ovarian cyst. Appendicitis as the causative factor is indicated by general abdominal pain, which localizes in the right iliac region, nausea or vomiting following pain, and abdominal sensitiveness. The temperature is elevated slightly during first twenty-four hours, then higher, quickened pulse, and increased leukocyte count.

Acute cholecystitis as the causative factor is indicated by pain in the right upper quadrant, fever early, localized tenderness over gall bladder, and rigidity of right rectus. It is hard at times to differentiate this from acute appendicitis, as the pain may be referred to the right iliac region or the appendix may be high, or the gall bladder lower. Then too, they both may exist at the same time.

Perforated gastric or duodenal ulcer as the causative factor is indicated by sudden onset of continued upper abdominal pain and nausea simultaneous in onset, subnormal temperature, weak pulse, cold wet skin, shallow and painful breathing, anxious countenance, flat rigid abdomen, and sometimes history of indigestion, "gas and hunger pain."

Acute intestinal obstruction as the causative factor is indicated by obstinate constipation, vomiting, paroxysmal pain, with gurgling and

*Read at meeting of Southside Virginia Medical Association in Petersburg, March 13, 1923.

exaggerated peristalsis and progressive distention of abdomen. Temperature, etc., are later.

Ectopic pregnancy as the causative factor is indicated by sudden onset with regular and colicky pains, sometimes very few but excruciating, and localized more to one side; no fever, decidua, history of irregular periods, mass to one side of uterus, hemorrhage and shock much greater than visible loss of blood.

Appendicitis, cholecystitis, perforated gastric or duodenal ulcer, acute intestinal obstruction and ectopic pregnancy usually are the cause of a large per cent of cases of the acute abdomen, although the other causes mentioned are the causative factor occasionally. The patient, at the first time he is seen, may no longer be suffering from the original lesion, but from its effect, such as peritonitis, following perforation, hemorrhage of an ectopic pregnancy, gangrene, or toxemia from a strangulated hernia.

After making a diagnosis or determining the so-called acute abdomen, the main question is what is best to do. If seen early, operate immediately, but if seen later and the patient shows signs of progressive peritonitis developing, with the distended "silent" abdomen, rapid thready pulse, persistent vomiting, and mental acuteness, it is much safer to resort to the conservative treatment, or the Ochsner-Murphy method. In this way many times the patient is carried through who would have succumbed to operation. Operation can then be done later when thought best. Bottomley advises in early cases of peritonitis to operate at once, but in later cases to institute the Ochsner-Murphy treatment and start an hourly or half-hourly pulse chart. A pulse that shows a steady rise in rate at the end of two or three hours demands operation immediately, but a steady falling pulse rate shows that the infection is being overcome and operation may be safely postponed.

To illustrate the foregoing remarks, I wish briefly to report a few cases. Only the positive findings are given.

CASE No. 476. Age 24, white, housewife. Referred to hospital Sunday, June 25, 1922, 4:45 P. M. When first admitted, patient had a temperature of 102, pulse 120, very thready. She gave a history of a pain in the stomach starting three days previously, which had localized in abdomen. At this time patient was very much collapsed, heart sounds were

weak and irregular, abdomen slightly distended, and had board-like rigidity. She was immediately given 700 c.c. saline by vein, and heart stimulants. This revived her considerably. Leukocyte count at this time was 16,000; diagnosis, acute abdomen, and, from history, of appendiceal origin. Patient's abdomen was opened 6 P. M. of the same day. Right rectus incision. Ruptured gangrenous appendix was found, free pus in abdomen abundantly. Pus was aspirated with suction pump. Appendix tied off, not invaginated, and drains inserted. Patient's condition did not change during operation; no stimulation was given. After two more intravenous injections of saline at 6 hour intervals patient's recovery was uneventful.

CASE No. 582. Age 35, white, housewife, multipara. *History of present complaint*—Patient felt perfectly well when retiring the night of February 23, 1923. About three A. M., February 24, she was awakened with a severe pain in the abdomen; some nausea, no vomiting, pain remained about the same day of the 24th; she was admitted to hospital at 9 P. M., February 24th. At this time patient was rather collapsed, pulse rate 100, but weak, skin and mucous membranes pale. Pain was relieved somewhat with morphia administered previous to moving to hospital. Slight murmur was heard with systole over the mitral area. Abdomen was distended, and slightly rigid, felt spongy to palpation, and indefinite spongy mass could be made out on the right side. Blood examination showed 3,000,000 reds, 10,000 whites, and 60% hemoglobin. From the physical findings, the blood picture and a history of irregular menses, a diagnosis of acute abdomen caused by ectopic pregnancy with internal hemorrhage was made. There was no bleeding from the uterus. Abdomen was opened 4:30 A. M., February 25, 1923; right rectus incision; free blood gushed out of the abdominal cavity, when opened. The bleeding point was found to be a ruptured right tube. Blood clots were cleaned out of the abdomen, the tube removed and abdomen closed with no drainage. Patient is still in hospital and making an uneventful recovery.

CASE No. 379. Age 12, colored. Referred to hospital August 2, 1922, 5 P. M., and gave the following history before admission. Was taken ill five days ago with a pain in stomach; two days later pain localized over appendix,

and remained there 24 hours; since then pain has been over entire abdomen. On admission the abdomen was so rigid that no pathology could be made out. Pulse rate 104, rather weak, temperature 99; leukocyte count 9,000. With so much rigidity, the significant history, and the low blood count indicated a grave prognosis as the reaction of the body was not good. Diagnosis acute abdomen. At operation the same day a gangrenous appendix was found, free pus in abdomen, and a general peritonitis. Appendix was tied off, drains inserted, and abdomen closed. Patient died at 1:40 the next morning. This patient, we think, would probably have done better with conservative treatment or Ochsner-Murphy method.

CASE No. 579. Male, age 28, white, laborer. *Previous history*—Ten years ago patient was shot in abdomen with shotgun. Abdomen was opened at this time and some blood removed but no perforation of the intestines was found. Several weeks after this operation was done, abdomen was opened again for what he called "locked" bowels, and six inches of ileum was removed. During the past six or eight years patient has been bothered with constipation, and pain in abdomen. At one time he was in the hospital, and was told that he had adhesions. *Present complaint*—Patient went to work as usual, about 10 A. M. Was taken with a pain in the stomach and had to go home. There was no result from cathartics taken that night. Next day, Tuesday, his condition was worse, with pain in stomach and abdomen, and physician was called. The following day the patient was brought to hospital, at which time he was in severe pain, temperature 100, pulse 106, respiration 24, and was vomiting a green fluid almost constantly, and had to be catheterized. Pulse was weak, abdomen very rigid and slightly distended. Leukocyte count was 31,000. Diagnosis acute abdomen. Abdomen was opened at 6 P. M. same day; right rectus incision; intestines were ballooned with gas, and gangrenous from strangulation and abdominal cavity was filled with a thin watery pus. Long section of the small intestines was made, including the adjoining parts of jejunum and, ileum being gangrenous, were removed, and cut ends were sutured together by an end-to-end anastomosis. Peritoneal cavity was washed out thoroughly with normal saline, drains inserted and abdomen closed. Patient's condition was very bad at this time; pulse bare-

ly palpable, rate 149. Patient was put on heart stimulants, and morphia, gr. 1/6, every four hours; saline by vein every eight hours for three days; stomach washed out every six hours for several days. Vomiting continued for four days after operation and was relieved only by lavage. At present there is no drainage from abdomen. Patient is eating general diet. Patient is still in hospital and doing satisfactorily.

After all is said and done, the causative diagnosis of the acute abdomen is at times very difficult and sometimes impossible, but the crux of the situation is this: when in doubt, act, and act promptly and intelligently. A clean abdominal section made under proper conditions will do no harm. Neglect to act promptly will often cost the life of the patient.

DUTIES AND ADVANTAGES OF THE "WHOLE-TIME" COUNTY HEALTH OFFICER.*

By P. M. CHICHESTER, M. D., Leesburg, Va.
Health Officer, Loudoun County, Virginia.

In taking up a subject of this nature, I am not blind to the fact that it is not a subject usually discussed before practitioners. As a rule, a considerable gap exists between the State health authorities and the general practitioner. Doctors who have followed public health or preventive medicine as a specialty should be placed on the programs of the various societies more often, so that a close co-operation and feeling of good will may exist. It is a special branch of medicine and should be treated as such. Since my experience began, I have had the existence of this gap too frequently brought to my attention not to be aware of it. This difference, I know, is not without some foundation. There are two outstanding facts, which I believe are responsible for the existence of this feeling:

First, a lack of sympathy for and understanding of the general practitioner by the health authorities. This is not true of all health authorities.

Second, the great tension under which the physician works at all times, and a lack of knowledge of the health laws along with a lack of knowledge of some of the things which are so essential to the thorough working of a health department. This also is not true in every case. To lessen this gap, the "preventive specialist" should more frequently take part

*Read before the Medical Society of Northern Virginia, Maryland and District of Columbia, near Norbek, Md., May, 16, 1923.

in these meetings for the purpose of each becoming more familiar one with the other.

The man whose entire efforts have been spent in technical public health knows little of the difficulties of the physician in general practice. He knows a certain law exists and he knows a physician is supposed to comply with this law. I feel fairly safe in saying that I suspect a large majority of the physicians present have had, at some time or another during their practice, a communication from the health authorities, which has been considered uncalled for and possibly a little harsh. If you will recall, however, these letters are graded—that is to say—a first one to remind, and that followed by one more to the point, and this second letter usually comes as a result of previous trouble along the same lines. As a rule, this is the only means the health officer has of transmitting a certain health principle to the physicians. We have to admit that they, both physicians and the State boards of health, are somewhat out of touch with each other. The State health authorities are not always to blame, nor are the physicians. There must be a closer contact. Little can be accomplished by a correspondence school. The physicians cannot learn public health in that way, nor can the health authorities learn the difficulties of the practice of medicine. Preventive medicine or public health is just as much a branch of medicine for a specialist as pediatrics or surgery.

The health commissioners with whom I have had experience are all men of the highest professional type; but the work is so vast that they can only act in a supervisory way and the detailed work must be left to many subordinates, a great many of whom, through necessity are learning public health and can be readily classified as lacking, to a degree, in sympathy and understanding, but it must be so. There are men of inexperience on the public health side so far as the practice of medicine is concerned, as well as men of inexperience among the physicians so far as the public health is concerned. You cannot expect the high type of efficiency in the man who is using the position as a "stepping-stone." When he reaches a certain state of efficiency he steps on to the next class, because the salary is not sufficient to hold him and cannot be made sufficient. In comparison to its value to the people there is less available money for public health or preventive medicine than any other

public institution. As I have said before, this state of affairs is not entirely to be placed at the door of the departments of health. Some of the physicians in some instances, I am sorry to say, thoroughly justify a strained situation between themselves and the public health servants. Often this strained situation is unavoidable, sometimes neglect and occasionally indifference. I am not accusing the medical profession, of course. I only have in mind certain instances which have occurred in my experience.

Tact and experience are necessary, on the part of the health officer, in handling all such situations. I am sorry to say this essential is sometimes lacking. The physician cannot be expected to know all the "ins and out" which are absolutely essential for good public health work. He must have experience. In the medical profession, like any other, experience is the best teacher. I should say this is particularly true of medicine. So true is it that no man will impose himself upon the public now-a-days, without first serving an internship in a good hospital. After he gets this preliminary experience, he then begins practicing. Along with this practice he becomes acquainted with his health department at long range. His health department only asks co-operation and requires compliance with the laws, but the practitioner, occasionally, looks upon the health department as an abstract organization which only annoys him concerning reports and vital statistics.

Along with his practice the practitioner gains more and more experience in medicine, and more and more knowledge of the workings of his health department, but it is a slow process, as I have said, through a correspondence course. His time is full, all of it. He probably never sees any of the representatives of his health department. Practically the only point of contact is through the mails. This is very unsatisfactory as we all know.

Practically all the time the physician isn't spending in looking after his practice, he is reading medical literature, attending meetings, taking special courses,—in every way making himself better fitted to relieve human suffering. It is a noble idea, a noble thought, a noble calling. His mind and efforts are concentrated on the ill individual and in making every effort to relieve him. It is no wonder he does not know much about the health department. Particularly so long as Public

Health is not made a course in each medical school he should be able to talk in person with his health officer and tell him his troubles (for he surely has them). It isn't right for him to have to take his course at long range. Every community of a certain population should have a trained and practical man to look after its disease prevention.

Compliance with the law is a duty which is imposed upon us all, no matter what profession we follow, whether we be preachers of the gospel, lawyers or physicians. Because of the importance of health, there are a great many laws pertaining to it, and the physician is at times put to it pretty hard to comply to the letter. There should be a local health officer to aid him in every way possible.

I say the general practice of medicine is a wonderful, noble, Godlike profession. But, what of the men or group of men who are working equally as hard along almost the same lines, only applying their efforts to the public instead of the individual, and who are attending meetings, reading literature and taking special courses for the purpose of becoming as efficient as possible in preventing a good deal of suffering the practitioner is relieving?

Relief of suffering, and cure if possible, are essential and the individual sees that, and sometimes willingly pays for it—occasionally very dearly. He is supposed to pay directly for it. (He doesn't always, however.) He pays indirectly, through his taxes, for his preventive physician. He should have this servant close at hand where he can call on him directly and quickly, and feel sure that the health officer has a personal feeling for his particular case. He cannot see the results so well. When he is enjoying good health it may be on account of good milk, water, food or sanitary surroundings or an inoculation or vaccination, or all of these factors combined which are responsible for his happy state, or it may be due to health education received at some period of his existence. I say again, he should have his trained man at hand all the time to look after these things so vital to his health and happiness. As it is, his mind reverts to his last spell of illness and to the physician, who (to use his pet expression) "Pulled me through." He gives all the credit to his physician (where a great deal does belong), and to himself, when as a matter of fact a portion of the credit should be given the health officer, who should always be at his side armed with good health laws and

personally equipped with knowledge which make it possible for him to live happily and in good health. Could any profession be more noble?

Now, gentlemen, after explaining the situation as I have found it, and having brought out some of the advantages of the whole-time county health officer and some of the difficulties which must be overcome, I want to state to you in a brief way what I consider the duties of a "whole-time" county health officer, and to show further the advantages to the county and the physicians in having such an officer.

Certain health laws exist, and are necessary and reasonable. The fact that they exist makes it our bounden duty to comply with them. The fact that they are necessary and reasonable makes this duty easier.

At first glance, one would say that the health officer is working in opposition to the physicians. Is that true? No one would dare say that the physicians are working in opposition to the health officer. This would be equivalent to treason. But if they do not co-operate, and neglect and shirk their duties, they are working against the health officer, whose work stands for health and happiness in the community. I know it is the desire of every true physician to join in all the work for the public good.

Good public health work will eliminate a certain very objectionable class of work from the physician's practice. What true physician, these days, will not give up that portion of his practice on such diseases as diphtheria, typhoid and kindred maladies? The chances of unavoidable accidents are too great in such troubles for him to want them. What physician is not ready and willing to turn over (all but the treatment) to his health officer any of his communicable diseases, thereby relieving himself of the responsibility of the quarantine and the control of such diseases? In the country he cannot do this unless he has a whole-time health officer. To aid the practitioner in this way is a very decided duty of a health officer.

The whole-time county health officer fills in the gap between the State authorities and the county. He is the connecting link. He is constantly in touch with local affairs. He knows the local authorities and local needs. General principles are necessary, but each community has to have special modifications of these general principles. It is the health officer's duty

to apply these principles to the best advantage, always bearing in mind the local conditions.

Bearing the foregoing statements in mind, the whole-time health officer's duties are clearly cut out. We can place them under four heads:

First. His duty to the State.

Second. To the public.

Third. To the physicians.

Fourth. To the individual.

There is no special significance in the order named. His duties to each are equally binding.

His duty to the State is simple. He should be acquainted with the State health laws, and see that these laws are carried out. He must be tactful and in every way possible obtain results before resorting to force by law. He must keep the community under his jurisdiction in close touch with the unit head. To work conscientiously at all times.

His duty to the public is to see that his community enjoys the benefits of good health which are obtainable through close co-operation with the local physicians, and through educational propaganda; to see that each preventable disease is so isolated as to safeguard the surrounding public; to advocate vaccinations and inoculations of various kinds to protect the public; to call out all the resources possible from State and other sources to aid as far as possible in producing a state of good health in his community. He must bear the responsibility of the general health in his section. Burdens should be placed upon him which he must bear or he should get out for the next man.

His duty to the physicians is important and requires great tact. He must always bear in mind that the physicians and schools are the foundation of his disease control work; that he must say and do nothing that will in any way influence the feeling or opinion of a particular patient towards his physician, except to encourage confidence in the family doctor. The health officer must maintain the closest friendship with the physicians and, last but not least, he should prepare himself so that he can be of assistance to the physicians in clearing up difficult and doubtful diagnoses of the communicable diseases. The physician should feel that he is calling in a good, free diagnostician. In other words, he should be somewhat of a specialist in the communicable diseases, particularly from a diagnostic standpoint. A physician, who has primarily the individual in

mind, hates to put them to any unnecessary inconvenience; so the health officer should be such a man that the physicians can call on him without fear of any rash statements or action. None of us knows it all. We are all human and therefore, subject to error, but as I have said, experience counts for a great deal, and the health officer should have had experience in the diagnosing and control of communicable diseases, so that the general practitioner, who sees comparatively few such diseases, can call freely on his health officer.

The health officer's duty to the individual is simple, but nevertheless important. He should always consider the individual's feelings—making the burden of quarantine and all other burdens as light as possible, but always safe for the other man. He should lead the individual by education and persuasion rather than force.

A health officer should have two main qualities—leadership and technical ability. Of the two, possibly leadership is the more essential. He can gather about him, if needs be, skilled workers, but he must be able to lead these workers.

The whole-time county health officer comes nearer giving the rural practitioner the same advantages that the city practitioner enjoys than anything else. Every physician should be an advocate of good health. Our training calls for it. We take the "oath" when we graduate. With a health officer at his disposal, a physician can relieve his mind of the details of any situation pertaining to public health, if he will only report these conditions to his health officer as he comes across them in his practice.

To summarize: let me say that the county health officer has decided duties to the State, to the public, to the physicians and to the individual.

He gives to the State, to the public, to the physicians and to the individual his skill and time. He is due from the State, public, physicians and individuals a hearty co-operation. Without this co-operation he is compelled, at times, to resort to force, and his work is greatly handicapped.

He probably adds to the physician's practice because in his various investigations the health officer is constantly referring to family physicians people who would probably never have come to the doctor until too late. He asks in return that the physicians comply with the

law. That is reasonable, I think. The health laws of the State are our guide—they are essential and reasonable. I think a man should be thoroughly acquainted with these laws before he takes up medicine, and if he doesn't like them and doesn't pledge himself to comply with them he should choose another profession. He is dealing with too precious a commodity—life. It is the health officer's duty to see that they are carried out, and it is the individual's duty to carry them out. There is no law which, at times, does not work apparent hardship on some people. If we disobey or disregard the law, whether that law be of man or God, we are punished. It may be a slow process and it may be a slight one, but it is sure. I often feel like calling the laws pertaining to health "The laws of nature" or "The laws of God."

Anyone who objects to or disregards the principles of the health officer necessarily objects to the principles of the clergyman and the pedagogist. They are working for the three essentials of human happiness—a sound soul, a sound body and a sound mind. There can be no real happiness without a sound body. The straightest way, however narrow it may be, to this happy state of existence, is through *prevention*. The health officer works along these lines.

TREATMENT OF PULMONARY TUBERCULOSIS.*

By H. R. EDWARDS, M. D., Richmond, Va.

The chief factor in the treatment of tuberculosis, whether in a sanatorium or in the home, is REST, and this means rest of both mind and body. It is not enough to rest the body, if we allow the mind to be excited, for there is just as great and sometimes greater loss of energy by mental drain than by physical exertion. Physical rest is obtained by rest in bed or in a reclining chair in the open air, the details of which have to be altered to suit the individual cases and surroundings. Mental rest is a most important step in the treatment. Phthisiophobia is a condition present in more or less of the patients treated, and one of our first steps should be to reassure the patient and gain his confidence, explain to him that the process is a long one at best, but if followed

methodically there is no reason to believe that he cannot regain his lost health. This of course does not apply to the advanced case and those who we believe will not be able to respond to the treatment, but to the earlier cases or those with advanced disease yet who take care. There is nothing gained by not telling the patient the absolute truth, and explaining to him the various steps to be taken and why they must be taken. The only cases in which there is any excuse for not telling the truth are those of children below the age of understanding and others so far advanced that there is no hope for them. In both of these cases the parents or those responsible should be told, and they should be made to feel responsible for the proper carrying out of precautions.

Next in importance to rest is fresh air. The patient should live in this day and night. Fresh air may be warm or cold the same as stale air; proper ventilation, sleeping porches, window tents, roof tents, or bungalows, are advisable; if they cannot be had, there is always the possibility of opening windows. In outdoor sleeping the patient should be protected from draughts or exposure to rain and wind.

No less essential is proper diet. It is a most important part of the treatment of tuberculosis and will require considerable thought, especially for the bedridden case. The details of this phase will be taken up a little later.

SANATORIUM TREATMENT

The purpose of the sanatorium is to give the patients an intensive demonstration of the method of taking the cure. It offers systematic regimen and supervision, the most salient factor in the treatment of the disease. The usual sanatorium, unless making a speciality of the advanced cases, is best suited to the earlier cases or to those who are showing good resistance. That is to say, a case according to physical examination may be in a moderately advanced or a far advanced stage of the disease, yet ambulatory and able to react should he be permitted to take intensive rest and treatment. Much depends upon the morale in a sanatorium; if there are mixed cases the frequent deaths are discouraging to the others, and not only to them but they discourage the other early cases at the places from which those patients came. Most cases look alike to the laity; and a death at a

*One of a series of lectures and demonstrations to a class of physicians in tuberculosis held under auspices of the Health Bureau, Department of Public Welfare, Richmond, Va., February 15, to April 15, 1923.

sanatorium scares them so terribly that they will not go there for treatment.

For those of a suitable type for sanatorium treatment, it would be far better to have them in a sanatorium for a few months, chiefly to learn how to take care of themselves. Eventually, they must resort to home treatment, and it is far easier in the beginning of the treatment to learn how to conduct it with others in the same condition than to learn alone.

The sanatorium teaches the danger signs, how to take exercise, and when to stop. It further gives the patient some training in occupational therapy, and in many instances patients engaged in harmful occupations before their entry to the sanatorium are able to master a new source of income before they leave. This is very important, for what is the good of arresting a case and then allowing it to go back to the same old conditions, which means in short time another break down with an advanced condition and a consequent prolonged intensive treatment?

HOME TREATMENT

Eventually all sanatorium cases must resort to this type of treatment, and 95% of our active cases are taking it from various reasons. Sanatorium facilities are not adequate, finances interfere, and various other causes.

The fact that so many thousands of cases do improve and even cure themselves at home is ample reason to assure us that it is a perfectly feasible plan and can be done, that while it may be a little more difficult yet it is possible. Ideal treatment would be expensive; but, while we hold up an ideal to strive for, it is quite evident that all will not reach it. Still they can come as near as possible; and in this emergency the physician will be required to use his ingenuity constantly.

A few general considerations should suffice for a guide to the proper method of approaching this phase of the treatment. The patient should have separate quarters, that is he should sleep alone. The preferable place for his room and porch, if it is possible, would be a southern or eastern exposure, adequately protected from the elements, yet giving him the maximum amount of sunshine and fresh air throughout the year. If there is a pleasant scenic view, that should be taken advantage of. Often a room to the rear of the house is better than on the front, for then the patient is not so

constantly exposed to the passer-by. While active, that is maintaining a temperature of 99.5° or over, he should be in bed; after the acute activity has subsided for a few days to two weeks, he may be allowed to sit in a reclining chair in the open air. If it is not possible to have a sleeping porch, it is practically always possible to have some sort of a window tent arrangement whereby a patient can be in the fresh air day and night—the windows can always be opened. While in bed, use the minimum amount of bed clothing that is required to maintain body warmth. Remember that much depends upon the protection from beneath as to how warm the patient will be.

Separate dishes should be used, and they should be washed thoroughly immediately after every meal, in hot soap suds and water and finally rinsed in boiling water. When the case becomes closed, if this precaution will be pursued religiously, there will be no danger in using the dishes with the rest of the family.

Avoid hangings and draperies in the sick room as well as carpets; there should be nothing there but what can be easily cleaned or boiled.

CLIMATIC TREATMENT

Much in the past has been attributed to climate, and no doubt change of scenery and surroundings will have beneficial effects, but we have found that under proper living conditions we have been able to effect cures quite as well in the lower as in the higher altitudes, though the latter are, of course, more stimulating than the lower ones. There is a certain type of advanced case that does better in high altitudes than in lower; but usually when an advanced case has been treated in an extremely high altitude he would better stay there than attempt to return to a lower one. Here in Virginia the small variation in altitudes is not marked enough to make any material difference. The chief thing about climate is to get a plenty of pure fresh air with the maximum amount of sunshine and of days which the patient may spend out-of-doors.

EXERCISE

This is one of the most abused methods in our treatment, and one very simple if given the proper thought. I have many times told patients able to take exercise of say an hour twice a day that they could do anything they

wished provided they did not tire themselves. This of course would not include piano moving, mountain climbing, and strenuous exercises as tennis, baseball, etc. Many patients have suffered relapses days to weeks after some indiscretion in exercise. Hemoptysis often can be traced to over indulgence at some previous time.

Exercise should not be attempted until the patient has had a normal temperature for at least two weeks, and then only gradually, by walking the first day not more than 15 minutes morning and afternoon. Walking should be slow and on the level, if there is a slight grade take that in the first half of the walk, so that the return can take advantage of the down grade. It should be regular; the same amount each day. That is, suppose a case has 15 minutes b. i. d. and he wishes to save this up for a several hours' trip at the end of the week, he will invariably do himself damage. Regularity and systematic endeavor is the only way to attempt it. In case the temperature should be increased or there should be coughing, expectoration, or definite fatigue or dyspnoea from which the patient does not recover within an hour or less after his return, he should stop exercise. If his weight does not remain constant, but he loses gradually or his appetite does not remain as before he started it, he should take the rest again, and at each time begin all over again.

Exercise can be graduated from 15 minutes b. i. d. for the first week, increasing it 15 minutes if the case is able to stand it without any unfavorable symptoms each succeeding week until he is able to do two hours b. i. d. Even with this amount taken in the open air, many cases will show fatigue when returning to their former occupations.

Occupational therapy, as weaving, basketry, reed work, and metallurgy is ideal; croquet is perhaps the best game to play. Some sort of occupation should be encouraged wherever possible, for it makes the patient more interested, improves his general morale, and avoids the invalidism so disastrous to many.

SPECIAL TREATMENTS

Artificial Pneumothorax is a very valuable procedure in the treatment of certain types of cases; it should not be used, however, until the other more common means at our hand have

been exhausted and then only with the consultation of another physician.

Its indications are in those cases with a unilateral lesion to begin with. There are occasionally cases with a slight amount of healed tissue on the good side that are able to take gas, but it should be slight indeed. Hemoptysis that will not respond to any other method; cases showing a rapid spread of disease on one side, when all precautions as to rest, etc., have been tried faithfully; or those who have observed the "cure" for a long period, yet show active toxæmia without necessarily a spread of the disease, are its chief indications. The X-ray should be used in all these conditions before giving gas, if possible, as a diagnostic aid.

The idea in artificial pneumothorax is to put at rest more completely the diseased lung. Once started it often must be continued for months, though it is possible to decompress the lung and have healing continue. It is a method of resort only when the more simple methods fail, and then after careful consultation, X-ray, etc.

Its technic is too large a subject to enter into here.

Violet Ray is usually given in the mercury vapor lamps, the vapor being developed in quartz tubes; it is an artificial sunlight from which the irritating red rays have been removed and the healing violet or blue rays maintained. It is questioned by many, and lauded by as many more. In my own experience I have seen actual improvement in the following types of cases, glandular, intestinal, throat, bone and joint cases, and this seems to be the impression in general. In lung cases it is not so good, though as a psychic factor it may help. I have seen many cases with slight pulmonary lesions improve remarkably with violet ray treatment, but I doubt its value except from a psychic viewpoint. The mechanism of its action is not definitely known. Some strain the fact of the pigmentation caused, and some various other factors. We really understand it but little, yet it is evident that some types of cases are benefited.

Heliotherapy.—Sunlight in moderation and under supervision is a great factor in the same types of cases as mentioned above; more has been done with it in Europe than here, especially among the children and those with glandular and bone disease. Exposure should

be graduated in dosage and over small parts of the body at first, and never if streaks or fever appear.

Deep Therapy X-ray.—Its use is new and enough evidence has not been accumulated thus far to recommend its use as a general agent.

Dietetic.—Volumes could be written on diet but I will only mention the salient factors here. It should be nutritious and include rich milk, eggs, fish, fowl, meats in moderation, especially to those in bed, grains, fresh vegetables, fruits. High protein dietaries increase the burden on the kidneys and other eliminative organs, increase metabolism with an increase in respiration and on the whole should be restricted as much as possible. Alcoholics are never necessary. Meals should be regular t. i. d., except for those who are below weight, and if it does not affect their appetite at meals, provided they are showing a gradual gain in weight, broth, milk, eggnog, cocoa, and the like may be given between meals and before retiring at night.

The guide as to the amount to feed should be the weight chart; regular weighing on the same scales with the same clothing should be practiced. A slow gain in weight is much better than a rapid gain. It is essential that the patient regain the weight that was normal before his illness began and perhaps a few pounds (5-10) over, before he can feel that his weight is not a factor to be given special attention. Flabby flesh is injurious, the gain in weight should be associated with the gain in strength, and the hard firm flesh is the kind that will stay.

SPECIAL REMEDIES

Among the most common remedies used are cod liver oil, dram 1, t. i. d., creosote, ggts. 15-20 to tolerance and then reduce to 5-6 gtts., guaiacol carbonate, especially good in cases with wheezing, hypophosphites, arsenic, iodoform, etc. Most of these remedies have their place, but that place is not near as important as it was once considered to be, and it is always best to avoid their use as much as possible if the case can be induced to observe proper rest and other precautions. There is always danger of upsetting digestion.

Tuberculin has been much touted and in a limited number of cases is still capable of some good. It is best administered in a sanatorium under constant observation. The supply

should be fresh and renewed often; it is not a method to be used by the average practitioner. Its benefit is theoretically due to the stimulative action it is supposed to have on scar tissue formation. It is given in logarithmic doses infinitesimally small, and gradually increased over long periods of time, keeping just below the point of reaction. It is always used in conjunction with rest, fresh air, and proper diet, and it is often a question just which factor should receive the most credit.

TREATMENT OF SPECIAL SYMPTOMS

Cough.—First determine the cause; if catarrhal or nasal, treat accordingly. Cough syrups are irritating and to be avoided. Inhalation of tincture of benzoin with carbolic acid; formalin; or creosote, alcohol and chloroform, equal parts, is good. A morning cough on rising often responds to hot water and soda bicarbonate. Those due to throat coughs are helped by cocaine solution if severe, or bland gargles in the milder cases. Pleuritic cough responds to counterirritants, iodine, and in severe cases to morphia, which should be used only as a last resort. Pleurisy jackets, and strapping help. Heroin 1/6—1/2 gr. is used but is not a practical permanent relief. Stimulative expectorants as ammonium chloride gr. 3-5, or infusion of wild cherry are helpful. Avoid dust, smoke, and tobacco. Rest does more permanent good than anything else.

Fever.—If temperature is 99.5° or above, the bed is the only place, drugs should be avoided as long as possible; in a few cases some drugs as acetanilid gr. 2-3; phenacetin gr. 3-5 may be used; the cause is increased absorption of toxin and the best way to minimize this is to put the patient at absolute rest and keep him there for two weeks after the temperature has returned to normal. This helps to prevent the liberation of toxin.

Night Sweats.—Use alcohol sponges, sponges of alcohol and tincture belladonna, and avoid drinking large amount of liquids at night. Atropine, gr. 1/120—1/60, sulphuric acid 1% solution, agaricin, gr. 1/8—1/4, are accepted medicinal remedies.

Gastro Intestinal.—Regulate diet, correct constipation and use all simple methods before trying drugs; they only, as a rule, relieve symptoms and do not strike at the cause of the complaint. Vomiting in the morning or after coughing is controlled with cerium oxa-

late quite easily, gr. 8, an hour before the expected attack, as they often come at quite regular intervals.

As diarrhoea will be considered under complications, I will say no more now than that alum, whey, and broths are beneficial. Bismuth, acetate of lead and opium, thymol, salol and benzo-naphthol, are recognized remedies.

Hemoptysis.—A fair percentage of tuberculous cases have blood-spitting in some amount during the course of their disease; when it is small they do not become as alarmed as when it amounts to ounces. Coming so often in the early morning hours it is distressing indeed, for there is the sensation that it may not stop and the prospect of gradually bleeding to death causes a great deal of mental unrest. The pulse rate and tension are increased, which consequently tends to prolong the bleeding if not to increase it. So the first thing we must do is to reassure the patient if possible, gain his confidence and help him to believe that it will not amount to much and, if he can calm himself, it will be all right. This is not easy to do and is only possible if the patient has confidence in his physician.

If the blood-spitting is in the form of "streaks" only, carefully examine the condition of the gums, or other conditions in the mouth, nose, or throat that might be responsible. If it is suspected or definitely known to come from the lungs, the patient should be cautioned to observe more rigid rest, avoid all exertion or sudden expenditure of energy, and go to bed until it has ceased, and further to remain there for from five to seven days after. Many times this will avert a more serious hemorrhage. An examination should not include the expiratory cough for rales, as auscultation for ordinary breathing is sufficient. If there is a rise in temperature, the more necessary is it for the patient to be put to bed, for this indicates either a spread in disease or the absorption of toxin into the blood stream. Patients on exercise should stop until the streaking is over for a week, and then on returning to it make it gradual, though perhaps not over as long a period as in the beginning. Limit the amount of hot liquids especially, and give no stimulating foods. Iced drinks are best for a day or so, and they should be restricted. Bits of ice in the mouth are best for thirst.

Should these streaks become frequent, that is throughout the day, or even develop into frank hemoptysis of a dram or more at one expectoration, the patient should be put to bed absolutely and kept there for from one to two weeks after the bleeding has ceased or longer, depending upon the amount and the condition of the case. In those with large hemoptysis, reassurance of the patient is the first step. They should be put in a semi-reclining position, usually about 30° is the most favorable, an ice cap applied to the chest, and suitable basins provided for expectoration, which will not require the patient to exert any effort. When the amount is in ounces, a hypodermic of morphine should be administered. Never attempt any examination, except auscultation on ordinary respiration, and that is to be done with caution. Heat to the extremities, and bits of ice for patient to hold in the mouth should be given. Coagulin and serum is often good and, if the hemorrhage is not too large, will help to control it. Pearls of amyl nitrite, hypodermic injections of nitroglycerine, gr. 1/100, may be used to lower blood pressure. Atropine sulphate, gr. 1/100 to 1/50, often helps to check a hemorrhage. The numerous serums on the market have a place in the checking of hemorrhage. It is well to familiarize one self with them and use selected ones in conjunction with the above measures. Ergotol is used by some but is dangerous as there is always a secondary relaxation of the vascular system which may result in an even greater hemorrhage. The diet should be reduced to dry stuffs, no hot liquids or stimulating foods at all. The food is best given in form of toast, or crackers and cold milk. Some cases of small hemorrhage can be relieved by bits of salt in the mouth.

When the bleeding does not respond to the above, or there is a single large hemorrhage of say a pint or more at one time, with continued bleeding following it, and if the patient is known to have definite involvement of one side and it is determined that the blood is coming from this side, artificial pneumothorax should be considered, and not delayed more than a day if the foregoing means have failed to check the process. It may be necessary to continue the gas treatment for some time, as there is often great danger of repeated bleeding as soon as the decompression reaches a certain point.

Any patient with hemoptysis of one ounce or more at any one time should not be allowed to exercise or be out for a minimum of one week to ten days, and this time increased in length as the amount of bleeding is increased. The healing process in the lung where there is a constant movement is more difficult than on the exterior of the body where we can apply pressure and ligation to control bleeding.

In conclusion, let us recapitulate by putting the greatest emphasis on absolute rest during the clinically active stage of the disease, the maximum of pure fresh air and proper diet, the prophylactic treatment of all those exposed to tuberculosis to prevent new cases, exercise or vocations to be resumed under precaution always. Emphasis on the fact that sanatoria are for the most part educational centers best suited to the earlier cases. It is possible to conduct the "cure" at home, provided we have the co-operation of the patient, a prerequisite to the successful treatment of any case.

1110 Capitol Street.

SIGNIFICANCE OF A PROLONGED COAGULATION TIME OF THE BLOOD.*

By J. S. HORSLEY, Jr., M. D., Richmond, Va.

Prolonged coagulation time of the blood is either in itself pathological or an accompaniment of a pathological condition. The diseases in which pathological hemorrhages most frequently occur are hemophilia, chronic jaundice, purpura, and melena neonatorum. Purpura itself is really a symptom and not a disease and may occur with hemophilia.

The theory of the coagulation of blood most universally accepted in America is that of Howell, of Johns Hopkins. This theory in his own words is as follows: "In the circulating blood we find as constant constituents fibrinogen, prothrombin, calcium salts, and antithrombin. The last named substance holds the prothrombin in combination and thus prevents its conversion or activation to thrombin. When blood is shed, the disintegration of the corpuscles (platelets) furnishes material (thromboplastin) which combines with the antithrombin," and at the same time liberates more "prothrombin; the latter is then activated by the calcium and acts on the fibrinogen."

forming fibrin which is the foundation or basis of the blood clot. Thus,

Antithrombin antagonistic to prothrombin:

Thromboplastin + antithrombin frees prothrombin:

Prothrombin + calcium = thrombin:

Thrombin + fibrinogen = fibrin.

An abnormality in any of these four fundamental constituents of the phenomenon of coagulation will correspondingly alter the blood clotting time.

Howell and Holt described two new substances, in 1918, which are connected with the process of coagulation of blood: I. A phosphatid, designated as heparin, which is obtained most readily from the liver (dog). It possesses two characteristic reactions, (1) it retards or prevents coagulation of blood, both in the body and when blood is shed; (2) it causes a marked increase in antithrombin when added to blood or serum. II. Pro-antithrombin, an antecedent or mother substance for antithrombin is present in plasma and serum in considerable quantities and is converted promptly to antithrombin by heparin. Heparin inhibits clotting mainly by preventing the activation of prothrombin to thrombin. It acts as an antiprothrombin rather than as an antithrombin. Theoretically it is suggested that heparin and prothrombin are normal constituents of the circulating blood (not demonstrated for heparin) and together fulfill the function of safe-guarding the fluidity of the blood; e. g., preventing intravenous clotting. When blood is shed or when in other ways thromboplastin (cephalin) is added to blood the protection afforded by the heparin is overcome and thrombin is formed in amount sufficient to cause clotting. It is suggested that variations in the amount of heparin in the blood may suffice to explain some of the known abnormalities in coagulation, hemophilia, for example.

An excessive amount of oxygen, the restriction of food, the ingestion of large quantities of water, smoking of tobacco, are said to delay coagulation time. The injection of certain chemicals, particularly the extract of the head of the leech, called "hirudin," retards clotting. The coagulability of blood is also prolonged by certain snake venoms and after poisoning with chloroform or prussic acid. The effect of hirudin and of snake venom is believed by

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Howell to be due to the antithrombin contained in these substances. According to Whipple an excess of antithrombin is responsible for a large number and great variety of clinical forms of delayed coagulation, such as occur in septicemia, pneumonia, endocarditis, miliary tuberculosis, general vascular thrombosis, etc.

Drinker and Drinker have found that, in cats and rabbits, rapid progressive hemorrhage causes a decrease in the coagulation time, with an occasional exception. This is accompanied by a decrease in the amount of antithrombin. The latter may be due to simple dilution of the blood by an influx of fluid from the tissues or to a decrease in the amount of antithrombin formed. Most of the fluid entering the blood after hemorrhage comes from the abdominal region. This fluid is, according to Drinker and Drinker, lymph, not tissue juices. Lymph contains prothrombin and antithrombin in the same concentration as blood plasma, but much less material which may produce thromboplastin. There is, therefore, a relative excess of antithrombin in lymph which explains its long coagulation time. Addition of thromboplastic material to lymph causes it to clot firmly and promptly. In experiments carried out by these authors they found that the prothrombin changes did not offer any explanation for the decrease in coagulation time which occurred. The fibrinogen, estimated by the heat coagulation method, decreased as the hemorrhage progressed. Antithrombin decreased in amount when the coagulation time decreased and remained practically constant when the coagulation was unchanged. Platelets did not vary with rapid progressive hemorrhage. The results seem to differ from those obtained by Hanzlik and Weidenthal, who state: "Results of four experiments performed by us showed the coagulation time to be invariably and markedly shortened as the hemorrhage progressed." They, however, worked on dogs; but this hardly seems to explain the wide discrepancy. Experimentally this point still remains unsettled.

As yet the whole subject of normal coagulation of blood is in a theoretical stage and that of the significance of abnormal clotting time is even more theoretical. This is a step in the direction of the real facts, whatever they may be; but the true value of these numerous factors must be judged by their confirmation by

both experimental and clinical findings. Already some very practical points have been derived and applied successfully in the treatment of certain hemorrhagic diseases.

The cause of melena neonatorum is not definitely known, but it seems probable that it is not due to disease of the blood vessels themselves or to an infection, but is a congenital malformation of the blood, the exact nature of which is not known. Transfusion of whole blood is a specific treatment for this disease.

Prolonged coagulation is characteristic of true hemophilia. It also occurs in some forms of purpura of the secondary type, particularly in those in which the liver parenchyma is greatly damaged. Fibrinogen is produced in the liver and a deficiency of it is the probable immediate cause of the hemorrhagic tendency in certain diseases of the liver, such as acute yellow atrophy, cirrhosis of the liver, yellow fever, and in certain forms of poisoning, as phosphorus and chloroform. The coagulation of the blood is normal or only very slightly prolonged in all forms of idiopathic purpura (purpura hemorrhagica), and in most forms of secondary purpura, such as scurvy. In all these conditions it is likely that there is some defect in the formation of fibrin ferment.

Adis concludes that hemophilia is due to an inherited defect in the prothrombin, whereby it is less readily activated than normal. Sahli thinks the prolonged coagulability is due to a deficiency of thromboplastin and that this in turn comes from some defect both in the blood corpuscles and in the endothelial cells. Minot believes that the blood platelets in hemophilia are normal in quantity, but deficient in quality, probably lacking prothrombin. One of the most important methods of treating hemophilia is by serum therapy. It is the prothrombin in fresh serum that probably gives it its therapeutic value in checking hemorrhage.

The absence of the proper amount of calcium salts together with the somewhat obscure influence of such diseases as malaria, yellow fever, scurvy, jaundice, hemophilia, pernicious anemia, leukaemia, and alcoholism decrease the coaguability of the blood. Ottenberg and Lee suggest that the delayed coagulability in obstructive jaundice is due to the blood calcium entering into some sort of combination with the bile pigments.

At St. Elizabeth's Hospital we have ob-

tained very excellent results in the prevention of postoperative hemorrhage from cases of chronic obstructive jaundice by following the preoperative treatment suggested by Walters of the Mayo Clinic. Five c.c. of a 10% solution of calcium chloride in redistilled water are given intravenously, daily for three days, each time preceded by a determination of the coagulation time of the venous blood. If at the end of this time the clotting time has not been lowered to less than nine minutes, operation is postponed until such a reduction is obtained. Besides giving calcium chloride intravenously, large quantities of carbohydrates are given by mouth and glucose solution by proctoclysis, in order to increase the supply of glycogen to the tissues of the jaundiced patient. This is the food of choice for patients in toxic states as shown by Opie, and in cases of liver deficiency, as demonstrated by Mann. Large quantities of water by mouth increase the body fluids and help eliminate bile pigments.

In treating pathological hemorrhage, the main issue is to correct the cause of the prolonged clotting time. The exact cause is not always known, and when this occurs the following general measures should be resorted to: (1) Arrest of hemorrhage locally by surgical procedures, application of cephalin, blood platelet extracts or some of the other numerous similar preparations; (2) Attempt to correct the systemic cause of hemorrhage by whole blood transfusion, preferably given by the direct method. We get best results by using the silver cannula of Bernheim, connecting directly the radial artery of the donor with a vein of the forearm or elbow of the patient. The reactions that follow this are practically nil, and the blood elements are altered less than by any other method of transfusion, except direct union of the artery and vein by suture, which requires a good deal more skill and time. Transfusion not only furnishes the deficient blood constituents which promote a normal clotting time and stop the hemorrhage, but also replaces the lost blood. Carter and others have shown that the intravenous administration of citrated blood, which is very extensively used, will temporarily decrease coagulation time. Sodium citrate solution injected intravenously has a similar effect (Gerster). There are, however, two very good reasons why the citrate method of transfusion is inferior to the whole blood method. (1)

The number of the platelets is greatly diminished and their character is altered considerably by the citrate method. In hemophilia the replacement of normal platelets is most important. (2) Reactions of varying degree and severity follow in about 50% of all citrate transfusions. This factor is negligible in transfusion of whole blood by the direct method.

SUMMARY

1. The mechanism of both normal and abnormal coagulation of blood is still in a theoretical state.

2. From the few facts known already practical points in the treatment of hemorrhagic diseases have been successfully derived.

(a) Deficiency of fibrinogen in diseases of the liver.

(b) Deficiency in prothrombin and in the quality of the blood platelets in hemophilia.

(c) Deficiency of calcium salts, as in chronic obstructive jaundice.

3. Calcium deficiency may be treated successfully by intravenous injections of calcium chloride.

4. The general measures of treatment when the direct cause of prolonged coagulation is not known are:

(a) Arrest of hemorrhage locally by surgery, cephalin, etc.

(b) Correction of the systemic cause of hemorrhage by whole blood transfusion, preferably by the direct method.

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St. Elizabeth's Hospital.

THE PROBLEMS OF RURAL COMMUNITIES AS REGARDS PHYSICIANS.

By J. M. MILLER, M. D., Crockett, Va.

That rural communities have problems to solve in securing and holding competent physicians will, I think, be readily admitted by all who have given the matter any serious thought. We may, however, differ in opinion as to why it is that physicians hesitate to locate, and after locating, do not remain for any length of time, in country districts.

In my opinion, there are several reasons for this, two of which are of paramount importance to any physician who contemplates locating in the country, and several others whose importance will vary, depending upon the individual case.

The first reason we will consider, for the scarcity of country doctors, is one that will apply as well, though in less degree, to the towns and cities. Compared to the population in this country, there are fewer young men devoting themselves to the study of medicine today, than there were a few years ago. The reason for this is not difficult to find. The course of study is so long, and the cost so great, that many worthy young men, and women too, are barred from even commencing this study. The two years of preliminary college work, plus the four spent in the medical school, and, if he is to be well rounded, the one or two spent as an intern in some good hospital, consume from six to eight of the very best years of a man's life. The cost connected with this preparation will average probably one thousand dollars per year. Thus, the capable, intelligent young man with this capital can, by applying himself industriously and intelligently to business, have as much money at the end of the eight year period as the average country physician will have accumulated in a life time of arduous toil.

While money should not be, and in most of cases probably is not the sole factor, influencing us in choosing our work in life, still it is one of the things that must be considered.

In considering the reasons that apply exclusively to the scarcity of physicians in rural communities, I would mention, first, the absence of good roads. You, whose practice is altogether in the larger towns and cities, or in those rare country districts so fortunate as to be blessed with good roads, have no concep-

tion of the deplorable, damnable, condition of dirt roads, for three or four months in the year. They are either so muddy that a horse (for an automobile is not to be considered at this time) sinks almost, if not quite, to his knees, in old mother earth, at each step, or, if the weather is cold and the roads are frozen in this condition, they are as irregular as the surface of an angry porcupine's back, and the horse, if he is so fortunate as to stay on his feet, flounders from one eminence to a corresponding depression, almost wrenching his limbs from their sockets, to say nothing of the damage done to the small of the back and central nervous system of the rider. The means for successfully navigating, going over, or through these roads, as the case may be, has never yet been discovered, and probably never will be, so long as man remains the type of animal he is today. These roads in winter are the continual night-mare of the country doctor. The fear of being called to negotiate, by some means or other, some eight or ten miles of their uneven surface, is often his last conscious thought before dropping into a troubled sleep.

The next reason I would give for the scarcity of doctors in the country is the smaller scale of fees prevailing here. Instead of being smaller, I claim they should be larger in country than in city practice. One of the main factors considered in determining amount of compensation for our services is based upon amount of responsibility assumed by us in treating a case. The responsibility of a country doctor is much greater than that of his city brother. By reason of his isolation he must necessarily be more or less of a specialist in all that appertains to the practice of medicine. Of course, I do not mean that he must be a skilled specialist in all of these different branches of medicine but, if he is successful, he must know enough of each one to know when and where to refer his patients for proper special treatment when the necessity arises. You in the larger towns and cities, when you meet with a puzzling, perplexing case, can, in a few minutes, secure a competent consultant, but we in the country cannot do this; we must often bear the responsibility alone. Another reason, why we should receive greater remuneration for our services is, as has already been intimated, because of the greater difficulty we have in reaching our patients. The city man can reach his in ease and

*Read at the meeting of the Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

comfort, while we, often, reach ours with great difficulty and discomfort.

Among other reasons that could be mentioned why some physicians do not locate in the country is often the absence of proper school facilities, for their children, and high class educational entertainments for themselves and families. There are only 340 accredited high schools in the State of Virginia. Of course, most of these are in the towns and cities, leaving quite an inadequate number to be distributed amongst the various districts of the one hundred counties of the State. The physician with a large family, located in a community without good schools, cannot give his children the education often deserved, unless he has financial means other than that derived from his practice.

The physician and his family seldom have the opportunity of hearing an address or lecture, or seeing a play or picture that is truly worth while, without going to some town or city more or less remote from them. In the matter of moving pictures though, I believe we country people are to be congratulated on their absence. While some of them are, and no doubt at sometime most of them will be, of great educational value, they, as at present conducted, are probably conducive of more harm than good, and will continue to be, until purged of all such characters as "Fatty Arbuckle" and his kind.

So much for the problems confronting rural communities in securing and keeping physicians. What, of the solution of these problems? The first reason given for the scarcity of rural physicians is the comparative scarcity throughout the whole country. I am inclined to believe this the most difficult of solution of any of the problems mentioned. None of us, in order to secure more doctors, would, for a minute, be willing to lower our medical standards. We think too much of our beloved profession, to be willing to sacrifice quality, for quantity. Perhaps, until living conditions and traveling facilities are much improved in the country, thus inducing more to locate there, the State or Federal government, or both, may have to lend a helping hand, by advancing to worthy young men and women, carefully selected, the financial means necessary for them to apply themselves to the study of medicine. If the proposition to require these State aided graduates to practice for a certain number of years in some designated country district

smacks too much of the abolition of one's personal liberty, they could be required, when they become financially able, to pay back with interest the amounts advanced, thus creating a perpetual loan fund for the use of poor but worthy students. As the graduates become more numerous, some of them, by the sheer force of economic necessity, would naturally gravitate to the remoter rural districts.

The second problem, that of bad roads, is one to be solved chiefly by the community itself, perhaps, aided by the State and National governments. I am speaking now of the prosperous community. These communities can and, if the matter be properly and forcibly presented to them, most of them will, with or without aid, build good serviceable, hard surfaced roads. There is a field here for much missionary work, and I believe that the time has come when we physicians should endeavor by every means within our power to show these people the conditions that confront them, and state firmly the results that must inevitably follow, unless these conditions are remedied.

As to the road problem in those communities that are not prosperous, it must be solved, if solved at all, by Federal and State aid. The proposed bond issue is woefully inadequate to even alleviate, let alone cure, bad road conditions in remote rural sections. Nor would an issue of one hundred million do this. Some other means, with or without this issue, must be devised by our law makers, if these sections are to have the roads of which they are so badly in need.

The problem of small fees in country practice can be remedied by the medical profession and by it alone. The majority of country practice is necessarily among the farming class. The farmer is proverbially careful and cautious in the expenditure of his hard earned dollars. Most of them, however, are fair and recognize a good business proposition when properly presented to them. If once convinced that, in order to obtain first class medical service, the fees must be materially increased, they will yield with the best grace possible. So, this is simply a matter in which the physician must educate his clientele. Of course there must also be co-operation among the physicians themselves.

The problem of good schools is one that any prosperous community can solve for itself, and in the wake of good roads and good schools will naturally follow wholesome, legitimate,

and educational entertainment, recreation, and social intercourse.

In conclusion: Can these country communities secure and retain competent physicians? Yes, if they will pay the price. If they will make living conditions in the country attractive enough; otherwise, not. Unless this is done, physicians will continue in ever increasing numbers to shun and forsake the country and it will not be many years until a competent doctor in remote rural sections will be a *rara avis*, if, indeed, not entirely a thing of the past.

TETANUS: ITS ETIOLOGY, PROPHYLAXIS AND TREATMENT, WITH A REPORT ON CASES.*

By C. F. GRAHAM, A. B., M. D., Wytheville, Va.

Owing to the fact that for some unaccountable reason or reasons there has been in the past few years quite a noticeable increase in acute tetanus, in certain localities, notwithstanding we have at our command what I may call almost a perfect prophylactic, and as I have in the past two years personally treated, or been associated in the treatment of, four cases, after some trepidation I decided to write on tetanus as viewed by a general practitioner.

"1. From a study of the authorities on this subject it will be learned that in this country throughout the registration area deaths from tetanus have been rather uniform. 2. On the other hand in the British Isles tetanus infection is rising due to some cause and this rise began even before the war. 3. There has been, however, a marked diminution from the single class of tetanus cases due to accidents with Fourth of July fireworks. From this cause in 1903 there were 415 deaths, in 1908 seventy-six and since 1911 proper prophylaxis and the sane Fourth idea have reduced these almost to a negligible degree."

In this country tetanus is most frequent in the Hudson Valley, Long Island, and the Atlantic States. A few years ago it was almost unheard of in Wythe County and the author can remember only one death from tetanus recorded prior to the last two years.

In the two years ending December 31st, 1922, however, there have been seven cases of acute tetanus in the county with four recoveries. Four of these cases came under the author's observation and will be reported in this paper.

Tetanus is an infectious disease caused by the inoculation of the bacillus tetani in an initial wound. There are two main clinical varieties, the acute and the sub-acute, the acute developing in from one to ten days, usually seven, and the sub-acute in from ten to twenty-one days.

ETIOLOGY

The predisposing causes of tetanus are punctured, lacerated, and bruised wounds especially of the head and extremities which have been contaminated with dirt, particles of clothing, etc.; gun shot wounds, especially those of blank cartridges, all wounds containing foreign bodies, and those received in or near stables, manure pits, hog pens, chicken coops, and in fields where horses or cattle have been kept; also wounds contaminated with street dirt and all wounds where there is much destruction of soft parts with suppuration. The physician should bear in mind too that the removal of an encapsulated splinter or other foreign body has been known to be followed by tetanus, due to the freeing of spores into a freshly made wound and the destruction of the protecting membrane by the surgical procedure. *The exciting cause* of tetanus, of course, is the micro-organism itself which, gaining entrance through the wound, there multiplies and produces its toxin some of which, gaining admittance into the circulation, becomes fixed in the protoplasm of nervous tissue and some is absorbed by way of the peripheral nerve filament and, traveling along the axis-cylinders to the nerve center, becomes fixed to the nerve cells, thereby producing the characteristic nervous manifestations.

PROPHYLAXIS

The author wishes to state that he considers the prophylaxis of tetanus absolutely its most important treatment and the handling and cleansing of any wound which may be potentially the harbinger of a tetanic infection should be carried out with the utmost care and, in all cases where there is the slightest chance of this infection developing, anti-tetanic serum should be administered. My main object in writing this paper is to stimulate the more frequent use of anti-tetanic serum, especially as there is an apparent increase in the incidence of this disease in our section.

The method of treating the wound and the antiseptics of choice depend to some extent on the conditions existing. If the wound is a

*Read at the meeting of the Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

small punctured one, it should be well opened, thoroughly cleaned with hydrogen peroxide, cauterized with phenol and iodine, and then left open to heal, being dressed with some loose dressing that will not exclude air. If the wound is of large extent with much laceration and much foreign matter present, it should be thoroughly cleansed, the foreign matter being entirely removed even if to do so necessitates an anesthetic. The surgeon must bear in mind that extensive mutilating surgery can accomplish little and may even be harmful. Hydrogen peroxide should then be freely used, the wound dried, then painted with iodine. If too extensive for this, pour ether over wound and use wet dressing of Carrel-Dakin solution. Phenol solutions, permanganate, boric acid and bromine water solutions are also recommended. Personally, I always use peroxide of hydrogen, whatever other solutions are subsequently used as this is one place the peroxide acts as a good antiseptic as well as a cleansing agent since it gives off quite a lot of oxygen and the tetanus bacillus, being highly anaerobic, cannot stand oxygen. Also remember never to close a wound too closely but rather to allow healing by granulation. It is better to have a scar than a death. Next, all these cases should receive a prophylactic dose of tetanus antitoxin, 1,500 units, as soon after injury as possible and, if pus develops in the wound, if the wound be punctured so deep, or if the injuring instrument pass through any of the sinuses as the antrum of Highmore, or a gun shot wound of face or head or any injury where it is uncertain all foreign matter has been successfully removed, a second prophylactic dose of 1,500 units should be administered on the eighth or tenth day. Also, all cases coming to the physician for the removal of a foreign body, as splinter or wire from the finger, or piece of nail or a bullet from the foot, should receive the prophylactic dose of antitoxin. Even though the incubation period of acute or sub-acute tetanus has elapsed, as stated before in this paper, the surgical procedure of removing a foreign body which has been imbedded any length of time may break down the protecting wall and allow tetanus spores that were dormant to become active. A case is on record in which tetanus developed seventy days after the initial lesion. If these procedures are carried out the physician will be rewarded by almost 100 per cent prevention of tetanus and in those cases developing, following initial

doses of prophylactic serum, cures are much more readily obtained.

DIAGNOSIS

An early diagnosis of tetanus is not always an easy matter, yet it is a very important one, as the sooner active treatment is started the more favorable the prognosis. It is well that the general practitioner familiarize himself with its symptoms, especially the earlier ones, as it is to him that most of these cases first come.

The diagnosis is made on the clinical history of a wound, the type tetanus may be suspected in, the proper incubation period, together with tonic spasms of the following muscle groups not necessarily near the wound: masseters, posterior cervical, abdominal wall, spinal muscles, and the flexors of the extremities. These convulsions occur spontaneously, or follow either optic, acoustic, or tactile stimuli. Opisthotonos may occur and also the so-called sardonic grin. There is an increase of reflexes: those in the wounded limb often show "double jerk," throwing the muscles of that limb into tonic spasm. There is a rise in temperature, usually slight, as compared with the pulse rate which is rapid, poor in tension and volume; however, hyperpyrexia may occur and is sometimes the cause of death. Sweating is profuse and cyanosis often marked. Lock-jaw usually occurs but is often not complete. Patient complains of severe thirst and exhaustion, and death sometimes occurs from exhaustion. The mentality usually remains clear to the end and patient suffers horrible mental and physical anguish.

It must be differentiated from strychnine poisoning and tetany. In strychnine poisoning, a history of the use of the drug is important. In strychnine poison the muscles of the jaw are rarely ever involved and never early. Between the spasms there is complete relaxation of the muscles, while in tetanus it is only partial. In tetany the spasms are bilateral and symmetrical and are chiefly confined to the muscles of the distal portions of the extremities. There is also the peculiar conical shaped involvement of the hands, and the feet are semiflexed at the ankle and the toes strongly flexed.

TREATMENT

For convenience, we will divide the treatment of active cases into general management; local treatment of wound; medical therapy or

symptomatic treatment; and specific or antitoxin therapy.

General Management: Patients with tetanus should be placed in as quiet a section of the home or hospital as possible. The room should be darkened and all external stimuli avoided. No company should be permitted and even the family excluded except those needed to care for the patient. Patient should be placed on soft and liquid diet that is nourishing. Fluids should be forced. If jaws become locked, highly nutrient enemata or feeding by tube through mouth or nose may be resorted to.

Local Treatment of Wound: The wound should be opened and freely drained, after a thorough cleansing and cauterization. In some cases there is no evidence of a wound, the puncture or abrasion having entirely healed even without scar.

Medical Treatment: The medical or symptomatic treatment of acute tetanus is mainly palliative, as it can hardly be considered curative unless we consider the phenol treatment of Bacilli, or the magnesium sulphate treatment of Meltzer curative. Most of the authorities consider these curative only secondarily by their sedative action on the central nervous system; however, phenol is thought by some to neutralize the toxin of the tetanus bacillus. In a recent talk on this subject with a veterinarian, I learned that they use the phenol treatment along with serum therapy with apparently excellent results, similar to those obtained in the Italian and French Armies.

If the magnesium sulphate treatment is employed, the physician must bear in mind that hypodermic or intraspinal injections of magnesium sulphate solution, while it usually entirely stops the spasms, are not without great danger, as they are very depressing to respiration. Chloral hydrate in from 5 to 10 gr. doses and potassium bromide in from 10 to 20 gr. doses every three or four hours will usually aid materially in controlling the paroxysms. If the combination of chloral and bromide does not control the attack sufficiently, or if there is much pain, morphine sulphate in $\frac{1}{8}$ gr. doses every four hours is indicated or morphine $\frac{1}{8}$ gr. and atropine 1/200 gr. may be used.

Specific Treatment or Serum Therapy: A study of the literature on this subject shows some difference of opinion as to routes recommended. Matthias Nicoll lays great stress on

the intraspinal route, and S. O. Freedlander recommends keeping the blood stream as highly saturated with antitoxin as possible, while Wm. H. Park states that although antitoxin injected into the spinal canal and nerve trunk will block some if the toxin get free, it will not affect that already fixed to the nerve tissue, and the major portion is probably absorbed from the canal into the circulation and then has its effect by bathing the tissues through the blood stream and lymphatics. Therefore, as yet no arbitrary rule can be laid down for the antitoxin treatment of developed tetanus, except to say that the best results have been obtained by getting the patient thoroughly saturated with antitoxin as soon as diagnosed or better still as soon as it is strongly suspected since delay may mean death. I consider all tetanus cases should be hospital cases but recommend that, unless the hospital is within an hour or two journey, the physician obviate the delay by immediately giving the suspected patient 10,000 to 20,000 units intravenously and 10,000 units intramuscularly. Unless this is done, a delay of a few hours awaiting the train and the subsequent trip may result adversely.

REPORT ON CASES

CASE 1. A negro, male, fourteen years of age.

Complaint: Convulsions.

Present Illness: Seventeen days after having received a gun shot wound at base of spine, from blank shell, patient complained of stiffness of jaws, back of neck, and felt generally badly. On evening of 18th day, after having had several convulsions, I was called in and found an unmistakable case of developed tetanus.

Physical Examination: Temperature 102, pulse 130, respiration rapid and some cyanosis. Profuse sweating and patient very excited, reacting to the slightest stimuli of any type. Risus sardonius and opisthotonos present. Marked rigidity of neck, back and abdominal muscles. Jaws partially locked. Patient able to swallow, but with some pain and difficulty.

Treatment: Morphine sulphate $\frac{1}{8}$ gr., 1 dose. Bromide of potassium ten grains every four hours. Forced water and liquid nourishment. 6,000 units of tetanus antitoxin intravenously immediately. This amount was all that was available at time. It was necessary to wire for

larger amounts. Wound cleansed and dressed. Second day, 19th day after injury, routine treatment, 15,000 units antitoxin intravenously; 5,000 intramuscularly. Third day, patient more quiet, convulsions less severe and less frequent. No antitoxin. Pulse, temperature and respiration improved. Fourth day, routine treatment; 10,000 units antitoxin intravenously. Patient apparently about the same as third day. Fifth day, patient had a relapse and looked much like he did on first, except cyanosis and opisthotonos were more marked. Patient died early on sixth day apparently from exhaustion. Convulsions had ceased.

CASE 2. A white adult, male, about thirty-five.

Complaint: Felt very badly and had headache two days. Slight stiffness of neck and back muscles; one spell of jerking or trembling of muscles.

Present Illness: Eight days before coming to us, patient fell on a rock in branch in his barn lot, cutting through his overalls, pants, and underclothes, bruising skin over knee cap and cutting it slightly. Then cleaned out stable and bedded horses for night. Applied iodine to cut and bruises on retiring.

Physical Examination: Temperature 100, pulse 120, respiration increased. Patient very nervous and fidgety, not characteristic of him when well. Wound on knee cap healed with slight scar. Slight swelling present with stiffness of knee joint. Very slight rigidity of neck and back, and masseter muscles. Jaws not locked. Knee jerks exaggerated and, following testing of same, slight convulsion of muscles of body generally. Patient's second convulsion.

Treatment: 10,000 units tetanus antitoxin intravenously. In fifteen or twenty minutes patient had moderate anaphylactic reaction although a desensitizing dose of antitoxin had been administered one hour previously to the intravenous dose. Became moderately cyanosed, complained of inability to get breath, severe gastric pain, and profuse sweating. One c.c. 1/1000 solution of adrenalin, ¼ gr. morphine, and 1/150 gr. atropine were administered hypodermically. Patient apparently normal in twenty minutes or half hour. About three hours after second convulsion, patient had a third of about the same intensity, and about three hours later, while en route to hospital, a fourth

of very much less severity. Wound was well opened and drainage established. Loose wet dressing applied; 10,000 units antitoxin were given intramuscularly. Patient went on to an uneventful recovery.

CASE 3. The third case developed in a young man seven days after he had had two of his fingers blown off by the bursting of an old automobile casing. He complained of slight stiffness in back of neck and of having had several spells which he described as making him feel that he was about to float away in air. During these spells there was some slight trembling which could not be definitely called a convulsion, and patient became very nervous and anxious about himself. Temperature 101, pulse 120, respiration increased. Some slight cyanosis, sweating during spell, and a very, very slight tendency to opisthotonos. Reflexes increased but taking of same did not precipitate an attack. As patient's family did not wish serum used at home, he was rushed to hospital and treatment instituted in next two or three hours. This patient, I learned after his recovery, had received one large dose of antitoxin intravenously. He had one convulsion after arriving at hospital and the physicians attribute his quick recovery to the earliness with which treatment was instituted.

The following is not a report on a developed case but is given for what it is worth, as I have had two cases similar to it. The fourteen year old daughter of the case reported above as case two, while playing bare-footed, fell in same barn lot as her father, bruising and cutting her leg, not sufficiently however to stop her from continuing her play in and out of the barn. The wounds suppurated. On morning of fifth day after her injuries her father brought her to us, complaining of severe headache and general aching. Temperature 100, pulse 120, respiration normal. The child was nervous but reflexes not exaggerated and there were no definite symptoms of developed tetanus. Wounds were thoroughly cleansed and dressed. Prophylactic dose of tetanus antitoxin administered. Child returned for examination and treatment, on evening of next day (about thirty hours). The wounds were healing nicely, temperature and pulse both normal, and child stated headache and general bad feeling had left her in about six hours after her visit to office previous days.*

*Case four not reported on.

SUMMARY

1. Tetanus infection seems generally to be on the increase and especially in certain localities.

2. The prophylaxis of tetanus is its most important treatment. Preventive doses of tetanus antitoxin should therefore be administered in all cases where wounds have been received that are likely to be infected, and a second dose given eight or ten days later, if conditions warrant, in addition to the local treatment. In some instances even a third injection may be necessary.

3. Developed cases of tetanus, in addition to radical cleansing, removal of infected tissues, and symptomatic sedative treatment, should receive large doses of tetanus antitoxin intraspinally, intravenously, and intraneurally, or intramuscularly.

4. Tetanus cases are best handled in a hospital but the general practitioner should not delay administering an intravenous or intramuscular curative dose of antitoxin if many hours must elapse before transmitting patient to hospital.

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AFTER TREATMENT OF OBSTETRICAL CASES.*

By H. R. FAIRFAX, M. D., Bristol, Va.

To prevent infection is of first importance. The eyes of the infant and open uterine veins of the mother are perhaps the most frequent points of entrance. Next come lacerations of soft parts of the mother. Immediately after the baby is born, see that any obstruction to respiration, as membranes over mouth and nose, or mucus in throat, are removed. Cleanse eyes with a solution of boric acid, then put a drop or two of nitrate of silver solution, one per cent, in each eye. This should be done in every case, whether you suspect gonorrhea or not. You had better use it in a thousand unnecessary cases than to neglect to use it in a single necessary case. It is surprising how many doctors in some sections still neglect this very important precautionary measure. A large per cent of the people in asylums and in-

stitutions for the blind, might be now enjoying life in the open with two good eyes, but for the neglect of some careless midwife, nurse or doctor.

I tie the naval cord three times. Some may ask why. First and second, to protect the child, and third to protect the mother, and, if there should be twins or triplets, to protect them. I had a friend who had the misfortune to lose a baby patient by not tying the cord but once, and as it was not tied tight enough, it slipped. The second ligature would more than likely have saved the child's life. I usually clamp the cord first with an artery clamp at points to be tied. This cuts through Wharton's jelly, leaves a nice groove for the ligature, bruises vessels in the cord, thus lessening the chance for hemorrhage or for ligature to slip.

If there is a laceration more than a small slit in the mucous membrane, I prefer to make immediate repair of the perineum. We can not hope to get as good union as we would at a later day, on account of the congestion and bruised tissues, but to leave an open lacerated wound, in my opinion, greatly increases the danger of infection.

The nipples should be bathed in boric acid solution just before and after each nursing for the first few weeks at least. If inclined to crack, zinc oxide ointment applied after each nursing gives much relief, hastens the healing and thereby removes another focus for infection. If the breasts are over distended and the baby is unable to keep the milk nursed out, the breast pump, hot applications and massage of the breasts may be necessary to keep the mother comfortable. The milk is thick and glands, especially in the primipara, are hard for a few days. Massage with the thumbs from without in towards the nipple will help to soften the glands, give the mother relief, and frequently prevent abscess or pressure necrosis. In multipara, where the breasts are large and heavy, the figure of eight sling is recommended. For the first twenty-four hours liquid or very soft diet is best.

Now comes the question as to the length of time the patient should remain in bed. I was taught that the ninth or tenth day was the earliest a patient should be allowed to get out of bed. It is still a disputed question and after twenty years' experience I am convinced that this length of time is not always necessary and in many cases the patient will fare better if

*Read at meeting of Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

allowed to be up earlier. My object in preparing a paper on this subject was, if possible, to get a discussion to bring out the ideas and compare the experience of others along this line. In the earlier years of my practice I had many obstetrical cases among women of foreign birth and in the mountain section of one of our neighboring states. Most of these women were strong and robust and frequently, while I was away, did as they pleased, which was to get up on the second or third day and, by the end of the tenth or fourteenth day they were doing their usual house work, with sometimes washing and ironing included.

About five or six years ago I read an article in one of the medical journals by Dr. W. S. Gardner, of Baltimore, in which he advocated letting obstetrical patients up early, if they were strong and robust. Let them be propped up in bed the second day, he said, and get out in a rocking chair for a short while on the third or fourth day. His claims were, a shorter period of confinement, better drainage and, as a result, fewer cases of infection, with more rapid recuperation. Since reading that article I have adopted that treatment, or rather advocated the early getting out of bed, but insist that the patient keep in the reclining position, and not stay up over one-half hour at first, then double the time each day and, after a day or two, divide the time, half in the morning and half in the evening.

I have had many women to tell me, that they felt better after getting up on the third or fourth day than they did in previous confinements on the ninth day.

I feel sure that many will disagree with Doctor Gardner and me in this and will say, subinvolution, relaxed abdominal walls, and other troubles follow such treatment. After five or six years' experience with this method and many subsequent examinations, I can truthfully say, so far as I can tell, my patients have had fewer infections and no more displacements of uteri and subinvolution than those in previous years, who were kept in bed for nine or ten days. If a patient has had a laceration, an unduly long labor, an instrumental delivery, or severe hemorrhage, I do not insist on her getting out quite so early, but wait a few days longer until she regains more strength, in other words, until she feels able to get out. She is instructed to have some one to assist her when she gets up, then, if she becomes faint, has a

hemorrhage or much pain in her back, she is to return to bed at once.

In a recent letter of inquiry to Doctor Gardner, he makes the following reply: "My ideas about the value of the upright position after labor have not changed. The only difference is that all the labor cases that are normal that I see are in the hospital and I always insist that they have a Gatch bed and they are put in a partial sitting position for a part of the time from the very first. The instruction to the nurse is, 'Do not allow this patient to lie continuously on her back.' Since these patients are never flat on their backs for twenty-four consecutive hours and, after the first few days, sit bolt upright in bed, I do not bother much about what day they actually get into a chair, but tell them that they may get up whenever they want to. The infected cases, whether at full term or miscarriages, are put at once in the upright position without reference as to how long it has been since delivery and without reference to the type of infection. The higher the fever, the straighter you set them up. In the infected cases I do not simply tell them to get up, but have them bring in the old rocking chair and put them in it while I am there."

I usually give ergot or one of its derivatives, ergotole, ergotin, etc., soon after the delivery of the placenta and find, if the clots are expelled and uterus well contracted, that there will be fewer after pains, also fewer cases of subinvolution. Have patient or assistant to hold uterus in contracted condition for half-hour or longer as necessary. Keep bowels open, one action a day at least, and castor oil perhaps is the best if a purgative is needed. If this is given in hot sweet milk, it is practically tasteless. I usually prescribe a tonic, as I. Q. & S., to be taken for ten days or two weeks and this I believe will shorten the period of recuperation.

From two to six weeks after confinement a final examination is advised and, if the cervix is found lacerated, or there are other injuries or displacements, they may then be remedied or corrected.

POTT'S DISEASE, WITH SPECIAL REFERENCE TO ITS DIAGNOSIS.*

By Wm. F. FOGERS, M. D., Bristol, Va.

Credit for the first description¹ of the condition which has since borne his name has been ascribed to Percival Pott, who in 1779, pub-

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lished an account of this deformity in an article on palsy from spinal caries. Pott described the deformity and the sequelae of this condition although its tubercular nature was not mentioned. The discovery of the tubercle bacillus by Robert Koch, over one hundred years later (1882) shed new light upon the entire question of diseases of the bones and has helped solve many previously obscure problems of this nature.

Pott's disease is variously designated as tuberculosis of the spine, tuberculous spondylitis, vertebral tuberculosis, caries of the spine, angular curvature of the spine, kyphosis, hump-back, etc.

Tuberculosis of the spine is a very common form of spondylitis. It may develop in persons of all ages, including the later years of life, but is most frequently found in children up to the tenth year. The condition is fairly well divided as to sexes, being encountered, perhaps, slightly more often in the male. It usually follows in the wake of lowered vitality, malnutrition or unhygienic surroundings and frequently, in childhood, closely upon an attack of measles, scarlet fever or whooping-cough.

The disease is essentially due to infection of the vertebra with tubercle bacilli, but its influence on the system, as contrasted with tuberculosis of other bones and joints, seems to be exerted to a greater degree on the entire mechanism of the body. Among the additional predisposing causes, traumatism and heredity claim an indefinite amount of consideration. The particular injury to which the patient may trace the beginning of the trouble may have been but a means of precipitating the latent condition. The question of the likelihood of the predisposition to hereditary transmission, as also the question as to whether the condition is primary in the vertebral column or secondary to tuberculous disease elsewhere in the body is still debatable. Nor does the fact that the pulmonary tubercle is generally found at autopsy help to throw any light on the subject. According to Tubby's² observations, the sequence of events in children, in the majority of cases, is as follows: tuberculous dactylitis, glands, coxitis or other variety of arthritis persisting for some months or a year, followed by the onset of spinal caries—rarely is the reverse order of events observed.

It affects, primarily, the marrow of the vertebral body, the bony structures, such as the

pedicles, laminae and lateral masses escaping invasion at the start. More often the anterior portions of the body are affected than elsewhere. In most cases the whole body of the vertebra is attacked, spreading from one to the other beneath the anterior ligament. As this osteomyelitic process advances, the bone becomes affected, softened, and gradually is crushed by the superimposed weight. The collapse of the vertebrae causes an angulation at the point of disease, the upper portion of the vertebral column falling forward, so that, at the point of angulation, one or more of the vertebra become prominent behind, producing the well-known deformity of "hump-back," or kyphosis. The infection is usually confined to one or more adjacent vertebra, rarely to two separate portions of the spinal column.

Among the various conditions consequent to a tuberculous lesion here, as elsewhere in the body, is the softening and breaking down of the tuberculous tissue and the formation of a tuberculous abscess, generally known as cold abscess. This may rupture the anterior ligament, at any time, and may finally reach the surface. In high cervical disease it usually reaches the posterior wall of the pharynx as a retropharyngeal abscess; in the dorsal region the abscess usually lies in the mediastinum or penetrates between the ribs and appears behind the diaphragm. In the lower dorsal and lumbar regions, it follows the course of the psoas muscle and appears above or below Poupart's ligament. In still other cases it penetrates the loin above the crest of the ilium, the outer border of the erector spinal muscle forming a lumbar abscess. Although most abscesses follow one of these courses, all sort of deviations are possible—into the lungs, pleura, intestines, bladder, scrotum, etc., sometimes disappearing without ever reaching the surface. As a result of displacement of the bones, the spinal cord may be compressed, producing symptoms of a compression myelitis.

In order to properly diagnose tuberculosis of the spine, a full understanding of the symptoms is also essential.

In children there is languor, loss of flesh and strength, lack of endurance and disturbance of sleep. If carefully watched, it will be noted that, whether standing or sitting, the child supports himself by the arms, by means of a table or chair. Stiffness in walking is observed, rigidity of the spine being one of the most characteristic symptoms. In walking, the

child first places his feet with care, to avoid a sudden jarring, shifting most of the weight to the toes. Another characteristic feature is evidenced when, in picking up an object from the floor, the patient instead of bending his back, holds himself stiff and straight. Pain is noted early, and is a constant symptom of Pott's disease. It may be either local or referred, the latter being by far the more difficult of diagnosis in the early stages. It is usually referred to the distribution of the peripheral nerves from the cord at the level of the disease. In other words, if the diseased vertebra is in the cervical region, the pain will be referred to the back of the neck or below the occiput. In the dorsal region the pain is referred to the chest or, when lower down, to the abdomen. Epigastric pain, in the majority of cases, is often wrongly interpreted as stomach or intestinal disease when, in reality, it is the result of tuberculous disease on the dorsal spine. Two cases of this kind suggest themselves to the writer, one in which a woman was operated for gall-stones, and which later developed into a typical case of Pott's disease with resulting severe deformity, the other case being that of a young girl erroneously operated upon for appendicitis. Both these diagnoses hinged on the finding of a psoas abscess. These abscesses are secondary to disease of the vertebra. It should be noted that signs and symptoms of acute inflammation, such as pain, heat, redness and tenderness, are missing in these abscesses. Fever is either slight or absent, unless there is a mixed infection; likewise is leukocytosis either slight or absent, unless the skin is perforated and there is a mixed infection. When the abscess approaches the skin and becomes palpable, the usual signs attendant upon similar conditions, such as fluctuation particularly, are present. If perforation of the abscess is imminent, the overlying skin becomes thin, shiny, slightly reddened and, finally, purple. The abscess consists of a creamy, so-called tuberculous pus, mixed with cheesy matter.

A psoas abscess gives the signs of a tense elastic tumor in the lower lateral quadrant of the abdomen. It if finds its way below Poupart's ligament, the communication between the abdominal tumor and the swelling of the thigh may often be made out by palpation. Pressure upon the abdominal swelling increases the tension in the thigh, and vice versa, thus differentiating the condition from

hernia. In some cases a psoas abscess will present posteriorly upon the buttock. Those abscesses which follow the course of the psoas muscle are attended, first, by limitation of motion in the hip joint and, later, by a gradually increasing flexion of the thigh on the affected side, which cannot be overcome. It is usually not difficult to differentiate these abscesses from *tuberculosis of the hip joint* by the presence of an intra-abdominal tumor, in the former, and by kyphosis of the spine in the dorsal or lumbar region, respectively.

One of the main diagnostic features of the fairly well advanced stage of vertebral tuberculosis is the deformity caused by the collapse of the bodies of the affected vertebra. The result is a prominence of the vertebra in the back at the level of the disease, and angulation of the vertebral column. The kyphosis is most marked in the dorsal region where the spine is normally convex backward. Paralysis usually follows spinal deformity, but when these symptoms are reversed, confusion results.

A history of the case is essential. Often there will be elicited the history of a fall, a bruise or the like, which was perhaps unheeded at the time. In order to study the spine and to insure thorough observation, the patient should be stripped at the time of examination. It is often possible to make a probable diagnosis of Pott's disease by watching the motions, attitudes and general behavior of the patient. In the case of a child, it may at once be observed that so long as he is lying down or is held in the arms in such a position that the weight of the body does not compress the diseased vertebra, he will remain quiet and appear fairly comfortable. When placed in the upright position, however, he will immediately begin to cry. If the disease is advanced sufficiently, the deformity of the vertebra may be recognized at a glance, if situated in the dorsal region. The deformity will be less marked in the cervical and lumbar regions. One of the simplest means of detecting the presence of rigidity of the spine, as well as its locality, is to place the patient prone on a table and, by lifting the legs and thighs off the table, to observe the behavior of the different portions of the spine. As the patient is lifted from the table, the affected portion of the spine will remain absolutely rigid. If the disease is in the lumbar region, the muscles of the back will be thrown into spasmodic contraction. If in the cervical region, the rigid

position of the neck will be striking, even upon casual observation. In any case, if the patient is seated in an upright position, downward pressure upon the top of the head will call forth expressions of increased discomfort and pain. In the presence of tuberculosis in other regions of the body the cervical spine should always be palpated, and the pharynx and lateral regions of the neck examined for the presence of abscesses. Examination of the back should always be thorough. This may insure the finding of primary or secondary conditions. Difficulty in diagnosing the condition of the back may be due to lack of knowledge of the part, lack of thorough routine examinations, or failure to understand the mechanism involved. Many cases of pain in the back are encountered in connection with industrial work. In addition to the history of trauma, and a possible correlation of the occupation to the pain, a search for infection must not be omitted. Special attention must also be directed to posture and balance.

The following important points must also be included in order to ascertain all possible diagnostic signs: general condition, facial appearance, testing of reflexes, examination of the heart and vessels, thorax and pelvis, and above all, a full inspection of the spine accompanied by X-ray photographs.

The X-ray as a means of diagnosis is, unfortunately, of little worth in the early stages of the disease; later it is of value. The diagnosis of the first stages will have to be made on the symptoms and physical signs. Tuberculin tests have proven of the same assistance here as in tuberculosis of joints in other parts of the body.

The conditions which Pott's disease simulates are varied and numerous. They include, among others, *spinal fractures, torticollis, back strain, scurvy, rachitis, hip disease, spastic paralysis, pelvic abscess, sarcoma, carcinoma, sciatica, arthritis, spondylitis deformans, sacroiliac disease and syphilis.*

Typhoid spine may be mistaken for Pott's disease, but may be differentiated by its more acute onset, and by the fact that it occurs late in the course of typhoid. In typhoid spine the kyphosis seen in Pott's disease is rarely found. Where a bony ankylosis of two vertebrae occurs, typhoid spine may be suspected.

A positive Wassermann test and various other signs, combined with a history of syphilis, will differentiate *sphilitic arthritis* from tu-

berculosis of the spine. In children, the former condition is rarely found. There is usually less deformity, and the distinct kyphosis is lacking. When doubt exists, antisyphilitic treatment will settle the diagnosis.

Fractures or severe strains are among the conditions difficult to diagnose from Pott's disease, and in some cases, particularly in the cervical region, the differentiation is impossible unless confirmed by the X-ray. Treatment by fixation will cure the symptoms, even if of long-standing, only if disease is absent.

In view of the frequency of spinal caries, its importance to the general health of the patient, particularly in its connection with the spine--the central axis of the body--the subject is one which demands our earnest study and consideration. The question of diagnosis alone is an inexhaustible one, regarding which one is hardly able to do more than suggest its possibilities in a short article. Many textbooks deal at great length with this most interesting and tremendously important condition. In one of the most recent, Ely³ regards the condition as a much more favorable one than have most of our previous writers on the subject and, in closing, the writer takes great pleasure in quoting from this publication, sounding, as it does, a more cheerful note than the prognosis usually called forth in connection with this condition:

"Until recently, the prognosis of tuberculosis of the spine was bad, but modern methods of treatment have changed the outlook. Prognosis in simple Pott's disease now is good. Abscess formation makes the prognosis unfavorable. Disease of the cervical region, on account of the proximity of vital structures, has an added danger. Under operative treatment, Pott's disease can be brought to a standstill within six months. Without operation, three years may be said to be the minimum duration of treatment. Perhaps by strict attention to details and by vigorous measures, the hump may sometimes be made a trifle smaller. Under modern methods of treatment the enormous humps, so frequently seen in former days, are growing rarer."

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Roanoke—The Convention City.



Bird's eye view of Roanoke, taken from aeroplane.

"They call me the Magic City, I who am young and strong—
They call me the Magic City, but the name that they give is wrong.

I was not built by magic, though the wand of a fairy I claim
For the valley that's known as Roanoke, and the river that ripples my name.

I was not built by magic, but by sons of an ancient race,
Bold and dauntless of spirit, seeking a building place.

With the will and the strength of giants, fearless of struggle and strife,
They came from the vales of pioneer trails, steeled in the efforts of life.

Here by the crystal waters that flow from the mountain breast,
In the calm of the scented meadows, harboring peace and rest,
They set to the task of building in the alchemic mist of dawn,
And hammers rang as the builders sang of the work of their brain and their brawn."

To those who attend the annual meetings of the Medical Society of Virginia, with some degree of regularity, Roanoke probably needs no introduction. Those who have not attended a Roanoke meeting for some years may be interested in knowing what sort of a city it is at this time.



Hotel Roanoke, headquarters for meeting.

A young town, its age has not yet reached the fourth decade. Men not yet by any means aged have ploughed corn and hunted wild game where now stand imposing eight-story buildings and busy marts of trade, and surrounding these the homes of close to sixty thousand people. Protected by the encircling mountains, she enjoys a climate that knows naught of the extremes of heat and cold which other less favored regions may experience.

Surrounded by a rich agricultural country, Roanoke has an abundance, not only for her own support, but also to supply localities that consume more than they can produce. Broad, smiling, acres of grain, and of garden crops, and of alfalfa, lie just beyond her

outskirts. Factories and mills, whose bustle and whirl never stop by day or by night, are part and parcel of her life, and whose pay-rolls furnish the sinews of war measured in hundreds of thousands. Two railroads, with wide-stretching arms extending east, west, north, and south, supply adequate and ever-busy facilities for communication with the world at large.

Space forbids mention of all the civic, and cultural, and patriotic organizations,—the Rotary, the Kiwanis, the Lions, the Men's and the Women's University Clubs, the Thursday Music Club, and Parent-Teachers' Association,—to name only a few; while of course there is a wide-awake Chamber of Commerce, and a Wholesale Merchants', and a Retail Merchants' Association in the business circles of the place.

Pre-eminently a city of churches, and of notably good church attendance, she has organizations of all the leading Christian faiths, and handsome edifices are dotted thickly within her boundaries. Largely a town of young people, Roanoke has had to exert every energy to keep pace with her amazingly fast-increasing school population, and it has been well-nigh impossible to build schools fast enough to

house the youth demanding educational facilities.

In addition to its splendid public schools, Roanoke and vicinity lay claim to three of the best known colleges in this State—Virginia



Municipal building.

College, beautifully situated within the city limits, Hollins College, a short ride from the city, both for girls, and Roanoke College for boys at Salem—all recognized as among the best in Virginia. Fond memories are aroused in many by the mere mention of the names of these colleges and their fame extends far beyond the boundaries of our State.

Of hotels there are some half a dozen, attractive in appearance and modern in every way, with cheerful, comfortable rooms, and a cuisine that will satisfy even the most fastidious; while of cafes and restaurants, they are beyond numbering. Hotel Roanoke, where the meetings will be held, is perhaps the most imposing in appearance, located on a slight elevation, with wide-sweep of shaded lawn, whose maples touched by the breath of October, reflect all the tints of the glorious autumn sunsets. For those preferring the intimate close touch of the town the Ponce de Leon, or the Lennox, or the several other hostelrys, stand always open.

In the hospital line five commodious and excellently equipped establishments for whites, and a large and well-appointed one for colored people, supply every need in the way of medical and surgical treatment. Near at hand is also the State Sanatorium at Catawba, and even nearer that of Mount



Virginia College.

Regis. both treating tuberculous cases.

Within the corporate limits of the city, eight minutes' ride on a trolley is Mill Mountain, a steep rampart one thousand feet above the town, ascended by cable cars, the view from

whose summit is unsurpassed. A small hotel on top, noted for its chicken and waffle suppers, is a well patronized rendezvous in the social life of the community.

The Roanoke Academy of Medicine is well



Crystal Spring, Roanoke's chief water supply.



Elks' Home.



Public Library in Elmwood Park.

known throughout the State as one of the live and active medical organizations; and it is at this time working with the utmost earnestness to make the 1923 meeting a thorough success. It is the hope of every fellow of this local society, that ALL members of the State Society, and every doctor in the State who can lay aside

his work for even a day or two, will attend some if not all the sessions at this meeting.

DON'T FAIL TO SEE THE MAGIC CITY. The ladies will find much of interest in Roanoke, while the members are engaged in matters scientific.



Park Street High School.

Proceedings of Societies

The Southwestern Virginia Medical Society

Held its regular meeting at Abingdon, September 19 and 20, with an attendance of about sixty. The following officers were elected for the ensuing year: President, Dr. S. S. Gale, Roanoke; vice-president, Dr. D. L. Kinsolving, Abingdon; and secretary-treasurer, Dr. E. G. Gill (re-elected), Roanoke. The next meeting will be held at Radford, March 20 and 21, 1924. Two new members were received at this time: Drs. A. B. Graybeal, of Grant, and Hall, of Radford.

Drs. J. C. Motley, J. J. Giesen and Arthur Hooks were elected delegates to the Roanoke meeting of the Medical Society of Virginia, and Drs. T. K. McKee, W. W. Chaffin and H. R. Fairfax, alternates.

Botetourt County Medical Society.

Present officers of the Botetourt County Medical Society are Dr. E. W. Dodd, Buchanan, president, and Dr. P. K. Graybill, Fincastle, secretary. Dr. E. P. McCulloch, Troutville, was elected delegate and Dr. A. W. Hammond, Amsterdam, alternate to the Roanoke meeting of the Medical Society of Virginia.

Alleghany County Medical Society.

Present officers of the Alleghany County (Va.) Medical Society are: Dr. J. A. Riffe,

Covington, president; Dr. J. M. Emmett, Clifton Forge, vice-president; Dr. H. M. Anderson, Clifton Forge, secretary; and Dr. W. M. Revercomb, Clifton Forge, treasurer.

The Danville (Va.) Academy of Medicine,

At its regular meeting on September 11, elected the following officers for the ensuing year: President, Dr. C. B. Pritchett; vice-president, Dr. H. J. Langston; secretary-treasurer, Dr. Samuel Newman. Dr. R. Bruce James was elected delegate to the State Society meeting in Roanoke.

Book Announcements

Surgery of the Spine and Extremities. A Text Book for Student and Practitioners. By R. TUNSTALL TAYLOR, M. D., F. A. C. S., Professor of Orthopedic Surgery, University of Maryland and College of Physicians and Surgeons, etc. Philadelphia. P. Blakiston's Son and Company, 1012 Walnut Street. 8vo. 550 pages, with 604 illustrations. Cloth. Price \$7.50.

A Textbook of Chemistry for Nurses. By FREDUS N. PETERS, A. M., Ph.D., Author of several books; Professor Organic Chemistry, Hahnemann Medical College, Director of Laboratories and Professor of Chemistry and Metallurgy, Kansas City Dental College; Instructor in Chemistry in Kansas City Central High School for 23 years; etc. Illustrated. Second Edition. St. Louis. C. V. Mosby Company. 1923. 12 mo. 302 pages. Cloth. Price \$2.50.

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Editorial

Discovery of Anesthesia.

Medical men everywhere feel a keen interest in the fascinating story of the discovery of anesthesia. But particularly in the South this important historical medical event is of especial interest for reasons to be discerned in the perusal of the gripping recital by Dr. J. Marion Sims, reproduced in the editorial space of this journal, under circumstances given in the subjoined letter.

Richmond, Va.,

June 22, 1923.

TO THE EDITOR:

Dr. P. A. Wilhite of Anderson, S. C. has recently been a patient at St. Luke's Hospital, and while here showed me a copy of the VIRGINIA MEDICAL MONTHLY issued in May, 1877, containing the original article on "The Discovery of Anesthesia" by J. Marion Sims.

I was so much interested in the paper that I got my stenographer to make me a type-written copy. Knowing your interest in medical history, I send a copy of the article to you, believing that possibly some day you may reproduce it either in whole or in part in the VIRGINIA MEDICAL MONTHLY.

STUART MCGUIRE.

THE DISCOVERY OF ANESTHESIA.

By J. MARION SIMS, M. D., New York.

Long before the days of Horace Wells and of Morton and Jackson, we were on the eve of the discovery of anesthesia. In 1790, Priestly discovered nitrous oxide gas. In 1799, Sir Humphrey Davy experimented with it, and in 1800, he published his Researches, Chemical and Philosophical, chiefly concerning Nitrous Oxide Gas and its Respiration, in which he says, "As nitrous oxide in its extensive operations, appears capable of destroying physical pain, it may probably be used with advantage during surgical operations, in which no great effusion of blood takes place." Sir Humphrey Davy had inhaled the gas repeatedly for headache and other painful affections and, finding relief for the time, he suggested its use as an anesthetic in surgery, and if he had been a surgeon, there is no doubt he would have used it as such. But his great idea was lost to the world for more than forty years.

There are four claimants for the honor of the discovery of anesthesia, viz.: Crawford W. Long, of Athens, Ga.; Horace Wells, of Hartford, Conn.; W. T. G. Morton and Charles T. Jackson, of Boston. I propose to give a plain statement of facts bearing on the question, leaving the reader to draw his own conclusions.

The claims of Long have never been fairly stated in connection with those who came after him. I am ashamed to say I was wholly ignorant of them until a very recent day, and I believe that the great mass of the profession are in the same category with me. I became acquainted with the facts of Long's labors by mere accident.

In October, 1876, Dr. P. A. Wilhite, of Anderson, S. C., came to New York to consult me about the health of his daughter. Her case required a surgical operation, and it was necessary for her to take ether, which was given by Dr. Harry Sims. After the operation was over and we were waiting to see our patient fully restored from the effects of the anesthetic, the conversation naturally turned upon the wonders of anesthesia, when Dr. Wilhite said, "Doctor, I assisted at the first operation ever performed under the influence of ether." I said, "But how could this be when you have never been in Boston, and the first operation under ether was by Warren, of Boston, in October, 1846, or as some claim by Marcy of Hartford, in January, 1845." Dr. Wilhite then told me that he had assisted Dr. Crawford W. Long, of Georgia, in extirpating a tumor from the neck of Mr. Venable in March, 1842, while he was completely anesthetized by the inhalation of sulphuric ether—that Mr. Venable was as profoundly anesthetized as the patient then lying before us—and he also said that he had assisted Dr. Long to operate on other patients under the influence of ether in 1843 and '44, while he was a student of medicine in Dr. Long's office. He declared that Long was the real and original discoverer of anesthesia, and he believed that he would be so acknowledged if all the facts in the case were fully set forth. He further said that he presumed that he (Dr. Wilhite) was the first person who had ever profoundly etherized any one—and it was under these circumstances. Dr. Wilhite says that from the time he was ten years old (1832) he was familiar with the use of ether by inhalation as an excitant; that the boys and girls in his neighborhood near Athens, Ga., were in the constant habit of using it; that there was hardly ever a gathering of young people that did not wind

up with an ether frolic. Old fashioned "quiltings" were very common in his day and time, and in the evening the boys and the young men would go to these for the purpose of a dance or an ether frolic. On one occasion he met several young people at Mr. Ware's, about five miles west of Athens, at a quilting. The girls and boys all finished the evening by inhaling ether. Some would laugh, some cry, some fight and some dance, just as when nitrous oxide gas is inhaled. It was in the fall of 1839. Wilhite was a romping boy of seventeen. All the boys and all the girls had inhaled ether, some of them more than once. They were looking around for new subjects for it, when Wilhite saw a negro boy at the door who seemed to be enjoying the sport. Wilhite invited him to come in and try the ether. He refused. Other young men then insisted on his taking it. He refused again in a most positive manner; whereupon some of the thoughtless young men caught hold of the boy and called Wilhite to give him ether. He struggled violently but they threw him down and held him there while Wilhite poured out some ether on a handkerchief and pressed it firmly over his mouth and nose. He fought furiously. They persisted, thinking it was great fun. After a long struggle the boy became quiet and unresisting. The young men then let him alone. They were greatly surprised that he did not get up immediately and say or do some foolish thing for them to laugh at. He lay quietly and with stertorous breathing. They tried to arouse him but could not. They then became greatly alarmed, and sent one of their number on horseback for Dr. Sydney Reese, of Athens, five miles away. The messenger rode with all possible speed. He fortunately found Dr. Reese at home, who lost no time in going to Mr. Ware's. On his arrival he found the negro lying on his back still soundly asleep. The young ladies had left the frightful scene. Young Wilhite and his principal accomplice, thinking that they had in mere play murdered their fellow being, were so much alarmed that they contemplated making their escape from the country, but the timely arrival of Dr. Reese soon restored their courage. Dr. Reese heard the history of the transaction. He then threw water in the face of the sleeping negro, slapped him, raised him up, shook him violently, and after a little he was raised to consciousness, greatly to the relief of all present. The doctor then gave the youngsters a lecture on the dangers of such frolics, and cautioned them against a repetition of their heedless act. This, of course, broke up the ether frolics in this neighborhood. Dr. Wilhite thinks it was more than an hour from the time the messenger started for Dr. Reese, till he returned with him to Mr. Ware's. The distance to Athens and back was ten miles, and all

this time the negro boy was profoundly narcotized. This is unquestionably the first case in which sulphuric ether was ever given to the extent of producing complete anesthesia.

Dr. Crawford W. Long, now of Athens, Ga., was born in Danielsville, Madison County, Georgia, on the 1st of November, 1815. He graduated at the University of Georgia (then the Franklin College), in 1835. He studied medicine and graduated at the Medical Department of the University of Pennsylvania, in 1839. He then went to Jefferson, Jackson County, Georgia, where he practised medicine for many years. In 1842 he had four students in his office, viz.: P. A. Wilhite, John S. Groves, D. I. Long and H. R. P. Long. The two last were relatives of Dr. Long, and they are both dead. Wilhite and Groves are still living (1877). Dr. Long was twenty-seven years old. His pupils were all from

nineteen to twenty-one; they were on the best of terms with each other, the Doctor entering into all the sports of his pupils with a hearty good will, while he never neglected his duties as their teacher. On one occasion, they were talking about the inhalation of nitrous oxide gas, when one of his pupils asked him to make some for them. He said he did not have suitable apparatus for it, but that the inhalation of sulphuric ether would produce precisely the same exhilarating effect. One of the young men present said he had inhaled ether while at school, and was willing to do it again. They were all anxious to witness its effects. Dr. Long got some ether immediately and gave it to the young man who had previously inhaled it. He then inhaled it himself, and afterwards gave it to all present. After this, the young doctor and his pupils indulged occasionally in ether frolics.

On several occasions, Dr. Long became greatly excited and could not be controlled. On recovering from the ether intoxication, he frequently noticed that his arms and hands were badly bruised, and yet he was not conscious of having felt any pain at the time he was under the influence of the ether. He also noticed the same thing in his pupils.

They were often badly hurt by falls and blows and were not conscious of pain at the time. These facts, repeatedly observed suggested to his mind the idea of using ether to prevent the pain of surgical operations. He frequently spoke of this to his students, and at last he determined to give it a trial. Wilhite encouraged him by relating the case of the negro boy he had playfully and unintentionally put under the influence of ether for an hour or more in the Fall of 1839.

Dr. Long, having made up his mind to try the experiment with ether on the first favorable opportunity, says (*Southern Medical and Surgical Journal*, Dec. 1849):

"The first patient to whom I administered ether



J. MARION SIMS, M. D., LL. D.

Taken from portrait in the Valentine Meat Juice Company's offices, Richmond, Va. (Courtesy of Col. Mann S. Valentine, Jr.)

in a surgical operation, was Mr. James M. Venable, who then resided within two miles of Jefferson. Mr. Venable consulted me on several occasions with regard to the propriety of removing two small tumors situated on the back part of his neck, but would postpone from time to time having operations performed, from dread of pain. At length I mentioned to him the fact of my receiving bruises while under the influence of the vapor of ether, without suffering, and, as I knew him to be fond of, and accustomed to inhale ether, I suggested to him the probability that the operations might be performed without pain, and proposed operating on him while under its influence. He consented to have one tumor removed, and the operation was performed the same day. The ether was given to Mr. Venable on a towel; and when fully under its influence I extirpated the tumor. It was encysted, and about half an inch in diameter. The patient continued to inhale ether during the time of the operation, and when informed it was over, seemed incredulous, till the tumor was shown him. He gave no evidence of suffering during the operation, and assured me, after it was over, that he did not experience the slightest degree of pain from its performance." This operation was performed on the 30th of March, 1842.

"The second operation I performed upon a patient etherized was on the 6th of June, 1842, and was on the same person (Mr. Venable), for the removal of another small tumor. This operation required more time than the first, from the cyst of the tumor having formed adhesions to the surrounding parts. The patient was insensible to pain during the operation, until the last attachment of the cyst was separated, when he exhibited signs of slight suffering, but asserted after the operation was over that the sensation of pain was so slight as scarcely to be perceived. In this operation the inhalation of ether ceased before the first incision was made."

In a certificate sworn to by James M. Venable, on the 23rd of July, 1849, he says: "In the early part of the year (1842), the young men of Jefferson and the country adjoining were in the habit of inhaling ether for its exhilarating powers, and I inhaled it myself frequently for that purpose, and was very fond of its use. While attending the Academy, I was frequently in the office of Dr. C. W. Long, and having two tumors on the side and rather back of my neck, I several times spoke to him about the propriety of cutting them out, but postponed the operation from time to time. On one occasion, we had some conversation about the probability that the tumors might be cut out while I was under the influence of sulphuric ether, without my experiencing pain, and he proposed operating on me while under its influence. I agreed to have one tumor cut out and had the operation performed that evening (afternoon), after school was dismissed. This was in the early part of the Spring of 1842. I commenced inhaling the ether before the operation was commenced, and continued it until the operation was over. I did not feel the slightest pain from the operation, and could not believe the tumor was removed until it was shown to me. A month or two after this time, Dr. C. W. Long cut out the other tumor situated on the same side of the neck. In this operation, I did not feel the least pain until the last cut was made, when I felt a little pain. In this operation, I stopped inhaling the ether before the operation was finished. I inhaled the ether in both instances from a towel, which was the common method of taking it." Dr. Long's four students, Wilhite, Groves and the two Longs, also E. S. Rawls (now Dr. Rawls), and Andrew J. Thurmond, were

present and assisted at the operation. Dr. Wilhite tells me that the etherization of Venable was as complete as it is ever made now-a-days, and that Venable always declared that he felt no pain during the operation.

On the 3rd of July, 1842, Dr. Long amputated the toe of a negro boy, Jack, belonging to Mrs. Hemphill. Jack felt no pain, having been completely anesthetized.

On the 8th of September, 1842, Dr. Long exsected, without pain, three small cystic tumors from the head of Mrs. Mary Vincent, who was etherized for the purpose.

On the 8th of January, 1845, Dr. Long amputated two fingers for a negro boy belonging to Mr. Ralph Bailey, Sr., the patient being fully etherized and feeling no pain whatever.

* * * * *

Now let us see how the followers of Long worked out the problem of anesthesia without any knowledge whatever of his labors.

Horace Wells, a native of Hartford, Windsor County, Vermont, studied dentistry in Boston, and at the age of 21 (1836), he opened an office in Hartford, Connecticut, to practice his profession. His mind was early turned to the subject of preventing pain in the extraction of teeth. In August, 1840, Dr. L. P. Brockett, of Brooklyn, N. Y., then a medical student, went to Wells to have a molar tooth extracted, the operation was difficult and so painful that Wells said that there ought to be some method of mitigating such suffering, and that he thought a man might be made so drunk by the inhalation of nitrous oxide gas as to prevent the pain of dental and other operations. This shows how deeply impressed this subject was upon the mind of Wells at that early date. On December 10, 1844, Mr. G. Q. Colton delivered a lecture in Hartford, Connecticut, on "Laughing Gas," and after the lecture he administered the gas to Wells and several other gentlemen. One of them (Mr. Cooley), while under its influence, fell over some benches, and was evidently badly injured; when he returned to consciousness, Wells rushed up to him and inquired if he was hurt.

He replied "No." Wells then said, "You must have been hurt, for you struck your legs against the benches." The young man then, at Wells' suggestion, pulled up his pantaloons; the blood was running down his legs and his knees were badly injured. When again questioned by Wells, he said, "I did not feel any pain at the time." Wells then turned to a friend (Mr. David Clarke), who was near by, and an eye witness to all of this, and remarked, "I believe a man by taking that gas could have a tooth extracted or a limb amputated and not feel the pain." So thoroughly was Wells convinced of this fact that he told his wife on their way home that he intended to take the gas the next day and have a tooth extracted. On arriving home he left his wife, and went to see his friend, Dr. Riggs, to announce his great discovery, and his intention to take the gas for the extraction of a tooth. Riggs tried to dissuade him from it, but his mind was made up, and he said, "As the young man did not feel pain at the time he was hurt, why cannot gas be used in the extraction of teeth?" Early next morning (December 11th), Wells called on Colton and engaged him to go to his office at ten o'clock and give him the gas. Wells did not seem to feel any pain. He remained unconscious for a few moments, and on coming to, he exclaimed, "A new era in tooth pulling. It did not hurt me more than the prick of a pin. It is the greatest discovery ever made."

From that moment Wells' enthusiasm was un-

bounded. He immediately began the administration of gas, and daily extracted teeth under its influence, and other dentists in Hartford adopted the same practice with like success. Dr. Marcy, then of Hartford, on witnessing Wells' operations, told him that when a student at Amherst College, he, with other students, had, for amusement, often inhaled nitrous oxide gas and also the vapor of sulphuric ether, and that the effects of the two were identical; and he suggested to Wells to try ether as a substitute for the gas. On this hint Wells tried it. He inhaled it himself and he says, "I found it very difficult to inhale the vapor of ether in consequence of the choking sensation. For this reason and the reason that Dr. Marcy and myself came to the conclusion that nitrous oxide gas was not so liable to do injury, I resolved to adhere to this alone."

About a month after the discovery of anesthesia by Wells, Dr. Marcy (January, 1845), gave the vapor of sulphuric ether to a sailor for the extirpation of a small wen on the side of his head. The patient was insensible and the operation successful, but Marcy, after this experiment, still advised Wells to stick to the gas as being more agreeable, and, perhaps safer than ether. Wells continued the use of the gas, and the dentists, (Riggs, Terry, Braddock and Crowfoot), and the doctors in Hartford were all convinced of its value as an anesthetic. But Wells felt that his great discovery should be laid more broadly before the profession of the world, and early in 1845 went to Boston for this purpose. Through his former pupil and partner, Dr. Morton, dentist, he was introduced to Dr. John C. Warren, Dr. Charles T. Jackson, Dr. Hayward and others. Dr. Warren received him kindly, and Wells remained in Boston several days with the expectation of giving the gas to a man who was to submit to an amputation at the hands of Dr. Warren. For some cause the operation was postponed. Wells was then invited to address the class at the medical college on the subject. He did so at some length, and then administered the gas for the extraction of a tooth. Unfortunately, the gas-bag was removed too soon; the patient was not sufficiently anesthetized; he screamed out and said he felt the pain of extraction, and the experiment was therefore a failure. Wells was hooted at and unfeelingly hissed out of the amphitheatre by the thoughtless young men present, and he was pronounced a charlatan and his anesthetic a humbug. He returned home greatly mortified at his failure, was taken suddenly ill and did not recover his health for many weeks.

In 1841-42, Morton was a pupil of Wells. In 1843, Wells established Morton in Boston, and for a while he was his partner. In 1845-46, after Wells' discovery of anesthesia, by the use of nitrous oxide gas, they had frequent interviews, sometimes in Boston and sometimes in Hartford. After Wells' unfortunate visit to Boston, Morton became greatly interested in the subject of anesthesia. Notwithstanding Wells' failure in Boston, Morton subsequently witnessed his continued success with the gas in Hartford, and was anxious to try it again in Boston. During one of his visits to Wells in Hartford, in 1846, Morton asked Wells to show him how to make the gas. Wells not having time, referred him to Dr. Charles T. Jackson to make it for him, as he was a chemist. On returning home, Morton called on Jackson for this purpose. Jackson told Morton that the manufacture of nitrous oxide gas required some nicety of manipulation, that there was danger of his getting nitric instead of nitrous oxide, and that he was too busy at that time to make it for him. Morton explained that he wished to use it to render patients

insensible for the extraction of teeth. Jackson then told him to use the vapor of sulphuric ether, saying that it was perfectly safe, could be easily procured, and that the students at Cambridge often inhaled it for amusement.

On the evening of the day (September 30, 1846), that Morton had this interview with Jackson, he gave the ether to a patient, and extracted a tooth without pain; and on October 16th he gave it in the Massachusetts General Hospital to a patient who had a tumor excised from the neck by Dr. John C. Warren. On the next day (October 17), he gave it to another patient for Dr. Hayward, who excised a tumor from the arm. He gave it also for Dr. Bigelow with equal success; and from that time it came rapidly into use by the whole profession throughout the civilized world. On October 27, 1846, Jackson and Morton published to the world, by letters patent, the discovery of letheon as an anesthetic, but it was seen at once that their letheon was nothing more or less than pure sulphuric ether. Jackson soon resigned his interest in the patent to Morton, and sent a communication to the French Institute, claiming the honor for himself for the discovery of anesthesia by ether. Morton then set up his claim as the real discoverer, giving Jackson credit only for some unimportant suggestions. While Jackson and Morton were sending bulletins to the Institute of France, Wells sailed for Europe in December, 1846, to lay his claims before the French Institute as the real discoverer of anesthesia. His mission was a failure and he returned home in March, 1847, to prepare the documents upon which his claim was to be presented to the Institute. And thus the tripartite war was waged with great fury, Morton and Jackson denying everything to Wells, and denying everything to each other.

They denied that nitrous oxide gas had any anesthetic properties. Wells brought forward his Hartford experience, and he gave the gas for surgeons in general practice, proving that prolonged operations could be performed under its influence. Dr. Marcy excised a large gland, the patient being under the gas for fifteen minutes; Dr. Ellsworth amputated a thigh; and Dr. Beresford excised a large tumor under its influence—all in Hartford. But notwithstanding all this, Wells saw nitrous oxide gas supplanted by sulphuric ether as an anesthetic—ether which he had tried and rejected. He saw his claims as the great discoverer of anesthesia unrecognized abroad, disputed and set aside at home, and he was disappointed and dispirited. He then went to New York to lay his claims as the discoverer of anesthesia before the profession of the great metropolis. Soon after his arrival in New York, he showed signs of mental aberration, and on January 14, 1848, in a fit of madness, he ended his life with his own hands.

* * * * *

Now let us summarize the facts set forth in the foregoing historic sketch. We know:

1st. That since 1800, the inhalation of nitrous oxide gas produced a peculiar intoxication, and even allayed headache and other minor pains.

2nd. That Sir Humphrey Davy proposed it as an anesthetic in surgical operations.

3rd. That for more than fifty years the inhalation of sulphuric ether has been practiced by the students in our New England colleges as an excitant, and that its exhilarating properties are similar to those of nitrous oxide gas.

4th. That the inhalation of sulphuric ether, as an excitant, was common in some parts of Georgia forty-five years ago, though not practiced in the Colleges.

5th. That Wilhite was the first man to produce

profound anesthesia, which was done accidentally with sulphuric ether in 1839.

6th. That Long was the first man to intentionally produce anesthesia for surgical operations, and that this was done with sulphuric ether in 1842.

7th. That Long did not by accident hit upon it, but that he reasoned it out in a philosophic and logical manner.

8th. That Wells, without any knowledge of Long's labors, demonstrated in the same philosophic way, the great principle of anesthesia by the use of nitrous oxide gas (1844).

9th. That Morton intended to follow Wells in using the gas as an anesthetic in dentistry, and for this purpose asked Wells to show him how to make the gas (1846).

10th. That Wells referred Morton to Jackson for this purpose, as Jackson was known to be a scientific man and an able chemist.

11th. That Morton called on Jackson for information on the subject, and that Jackson told Morton to use sulphuric ether instead of nitrous oxide gas, as it was known to possess the same properties, was as safe, and easier to get.

12th. That Morton, acting upon Jackson's off-hand suggestion, used the ether successfully in the extraction of teeth (1846).

13th. That Warren and Hayward and Bigelow performed important surgical operations in the Massachusetts General Hospital (October, 1846), on patients etherized by Morton, and that this introduced and popularized the practice throughout the world.

* * * * *

News Notes

Roanoke Welcomes You!

Doctors of Virginia, this applies not only to you but also to the ladies in your families.

Roanoke, one of the most progressive of the cities of Virginia, is pictured somewhat in detail under the heading "Roanoke—The Convention City," in this issue of the journal. Her citizens are enthusiastic and ever active in promoting the interest of their city and are truly "given to hospitality." You will find this out for yourself if you can avail yourself of the opportunity of attending the fifty-fourth annual meeting of the Medical Society of Virginia in that city, October 16, 17, 18 and 19.

Programs of this meeting should be in the hands of all members, having been mailed the first part of this month. If you have not secured your railroad certificate for the one and a half fare for the round trip, apply at once to the Secretary at the Society's offices in Richmond. The scientific and social features will be interesting. We will have as invited guests men whom you will wish to meet and hear. Good papers will also be presented by members. The ladies will find much of inter-

est in the work of the Woman's State Auxiliary to the Medical Society of Virginia and in the social affairs arranged for them.

If you have not made hotel reservations, it would be well to attend to this prior to reaching Roanoke. There are five hotels in Roanoke, as follows: Hotel Roanoke, Shenandoah Hotel, Ponce de Leon Hotel, Lenox Hotel, and Raleigh Hotel. Railroad schedules make Roanoke very accessible from all parts of the State.

A large attendance is anticipated and you will wish to be "among those present."

At the time of going to press, the following is list of delegates appointed from the various component societies of the State Society. If you have not yet appointed a delegate, it is not too late for representation. If impossible to have a meeting to elect delegates, have president of your local society make the appointment.

DELEGATES

Arlington County Medical Society—Dr. Stacey T. Noland; *alternate*, Dr. R. N. Sutton.

Bedford County Medical Society—Dr. W. O. McCabe; *alternate*, Dr. J. A. Rucker.

Botetourt County Medical Society—Dr. M. T. McCulloch; *alternate*, Dr. A. W. Hammond.

Danville Academy of Medicine—Dr. R. Bruce James.

Dimwiddie County Medical Society—Dr. F. J. Wright; *alternate*, Dr. J. M. Harwood.

Fairfax County Medical Society—Dr. F. M. Brooks; *alternate*, Dr. Tom Williams.

Floyd County Medical Society—Dr. C. W. Thomas; *alternate*, Dr. J. L. Harvey.

Nelson County Medical Society—Dr. J. B. Woodson; *alternate*, Dr. D. C. Wills.

Piedmont Medical Society—Drs. J. C. Flippin and Lewis Holladay; *alternates*, Drs. J. H. Neff and John W. Scott.

Richmond Academy of Medicine and Surgery—Drs. J. A. Hodges, M. W. Peyser, W. B. Blanton, E. G. Hill, A. L. Gray, M. E. Nuckols and M. P. Rucker; *alternates*, W. L. Peple, G. A. Ezekiel, Manfred Call, C. F. Ross, Fred Hodges, W. Nelson Mercer, and T. W. Murrell.

Roanoke Academy of Medicine—Drs. Claude Moore and T. Allen Kirk; *alternates*, Drs. J. D. Willis and J. R. Garrett.

Rockingham County Medical Society—Dr. J. E. Lincoln; *alternate*, Dr. George G. Snarr.

Southampton County Medical Society—Dr. R. L. Raiford.

Southside Virginia Medical Association—Dr. George H. Reese.

Southwestern Virginia Medical Society—Drs. J. C. Motley, J. J. Giesen and Arthur Hooks; *alternates*, Drs. T. K. McKee, W. W. Chaffin and H. R. Fairfax.

Wise County Medical Society—Dr. G. B. Setzler; *alternate*, Dr. C. B. Bowyer.

Norfolk County Medical Society—Drs. E. C. S. Taliaferro, P. St. L. Moncure, Julian L. Rawls, J. D. Collins and A. A. Burke.

Warren-Rappahannock-Page Medical Society—Dr. D. M. Kipps.

Medical Association of the Valley of Virginia—Dr. F. M. Leech.

Dr. Susan Field,

After spending sometime at Lincoln, Nebr., has returned to Farmville, Va., and resumed her duties in the Normal School in that place.

Southern Medical Association.

This Association is to hold its seventeenth annual meeting in Washington, D. C., November 12-15, inclusive, under the presidency of Dr. W. S. Leathers, of Jackson, Miss. This promises to be one of the "biggest" meetings in the history of the Association. There will be twenty sections and many papers of interest will be presented. In addition to the scientific program there will be golf, alumni reunions and entertainments for members and their wives and daughters.

The New Willard will be general hotel headquarters for this meeting. There are many excellent hotels in addition to this and accommodations will be ample.

It is planned to have an alumni dinner of the various medical schools represented in the membership. The time for this dinner has been set for Wednesday evening, November the 14th, and dining rooms have already been engaged. The Committee in charge wishes to know approximately the number of diners to be expected at each of these reunions and asks that those who expect to attend notify Dr. Tom A. Williams, Chairman of this Committee, 1746 K Street, Washington, D. C., by the end of October. Associated with Dr. Williams in looking after alumni from schools in this section are: Drs. R. B. Carmichael, Virginius Dabney, J. D. Thomas, W. H. Wilmer, W. B. Mason and B. M. Randolph.

The President of the United States will receive informally the members of the Southern

Medical Association and their wives, Thursday, November 15th, at 12:30 P. M. at the White House. Of special interest to the ladies will be the reception at the Washington Club on Tuesday afternoon, where Mrs. Woodrow Wilson will be the guest of honor. The usual reception to the President of the Southern Medical Association will be held on Tuesday night at the New National Museum, one of the most beautiful public buildings of Washington, a detachment of the Marine Band furnishing the music. Other special entertainments are being arranged.

Physicians who play golf are urged to bring their clubs. There will be a golf tournament at which the usual prizes will be offered. Play will be over the championship course of the Columbia Country Club.

Reduced rates have been granted by railroads on the certificate plan. Each member of the Southern Medical Association will receive a certificate without application for it. Any physician who is a member of his state and county medical society, although not a member of the Southern Medical Association, who desires to attend this meeting, can have the benefit of these reduced rates by requesting a certificate from the Association office, Birmingham, Ala.

University of Virginia News.

The one hundredth continuous academic session of the University of Virginia was formally opened September 27th, with a record attendance in all departments. In the department of medicine there was an increase of twenty-three over last year in the registrations on the evening prior to the formal opening; six of the fifty-four women who had registered to that time were in the department of medicine.

Among the gifts to the University, announced by President Alderman, were a portrait of Dr. Richard Henry Whitehead, former dean of the department of medicine, which was given by members of the medical faculty and students; \$10,000 from an anonymous donor for the establishment of the Richard Henry Whitehead scholarship in medicine; and \$1,000 from Dr. Seale Harris, of Birmingham, Ala., for the establishment of a scholarship in memory of his father, Dr. Charles Hooks Harris.

An unusual distinction has come to the second year medical class in that two of its members, Benjamin May Baker, Jr., Machipongo, Va., and Eldridge H. Campbell, Jr.,

Carbon, W. Va., have won the Rhodes scholarship. They left the 29th of September for England where they are to study at Oxford University as Rhodes scholars.

Medical College of Virginia.

At the opening of this school the middle of September, 530 students were matriculated in the three departments of medicine, dentistry and pharmacy—the largest enrollment since 1914—and more than 100 applicants for the study of medicine were rejected because of lack of space in the lecture rooms. It is apparent that something should be done to take care of students from this section who do not wish to go to schools further from home.

Dr. R. D. Thornton, for ten years a member of the teaching staff of the Royal College of Dental Surgeons of the University of Toronto, and known throughout Canada as an authority on dentistry, has been added to the dental faculty of the school. He will have the position of superintendent of the dental infirmary and professor of operative technic.

Dr. Thomas D. Jones

Has returned to his home in Richmond, after spending a year in postgraduate work at several New York hospitals and serving during the summer months as senior house physician on the Boston Floating Hospital for Children. He will move his offices to the Medical Arts Building, this city, upon its completion.

Secretary, N. Y. State Department of Health.

Dr. Matthias Nicoll, Jr., State Commissioner of Health of New York, has appointed Dr. Edward H. Marsh, of Brooklyn, as secretary of the New York State Department of Health, to succeed Curtis E. Lakeman who has resigned to take up a different work in New York City.

Civil Service Examinations.

The U. S. Civil Service Commission announces open competitive examination for the following examinations, applications to be rated as received until December 28, 1923:

Junior medical officer, to fill vacancies in the positions of physician in the Indian Service, surgeon in the Coast and Geodetic Survey, and physician in the Panama Canal Service for duty outside of hospitals;

Graduate nurse, and graduate nurse (follow-up), for filling vacancies in the U. S. Veterans' Bureau and in the Indian and Public Health Services.

Both examinations are open to all citizens of the United States who meet the require-

ments. These may be obtained from the above named Commission at Washington, D. C.

Dr. Joseph L. Spruill

Recently resigned as state clinician of the tuberculosis sanatorium, at Sanatorium, N. C., to accept the position as superintendent of the Guilford County Tuberculosis Hospital, at Jamestown, N. C.

Dr. B. B. Bagby,

Formerly of West Point, Va., but now in charge of the Henrico County Health Unit in its malaria control work, has moved his home to Richmond and is at 1402 Avondale Avenue.

Dr. R. E. Mitchell,

After spending two years in post-graduate work at the Brooklyn, N. Y., Eye and Ear Hospital, has returned to his home in Richmond and will limit his work to diseases of the eye, ear, nose and throat. He will have offices in the Medical Arts Building, which is to be completed shortly.

Dr. H. B. Mulholland

Has returned to the University of Virginia as instructor in Internal Medicine, after a service at Peter Brent Brigham Hospital, Boston, Mass.

Dr. Tom A. Williams,

Washington, D. C., by invitation, addressed the Delaware State Medical Association at their annual meeting at Middletown, October 10, his subject being Fundamentals in Psychotherapy.

Dr. Williams recently published a book entitled "Dreads and Besetting Fears, Including States of Anxiety."

Dates Selected for A. M. A. Meeting.

The Board of Trustees of the American Medical Association has selected May 19-23, 1924, as the dates for the Chicago meeting of the Association.

The American Roentgen Ray Society,

At its annual meeting in Chicago, last month, elected Dr. Hollis E. Potter, Chicago, as president. and Dr. George Winslow Holmes, Boston, as president elect. Dr. William Duane, of Harvard University, Boston, was the recipient of the \$1,000 Leonard prize, for the best original research in the field of roentgen ray, radium, or radio-activity.

Dr. W. S. Rankin,

Raleigh, N. C., State health officer of North Carolina, has applied for a year's leave of

absence, that he may work with the State Health Department of New York, upon their request.

Dr. and Mrs. O. J. Henderson

And son, of Montgomery, W. Va., recently visited friends in Northumberland County, Virginia. Dr. Montgomery is an alumnus of the Medical College of Virginia and has many friends in this section.

Child Health Station in Newport News.

The Newport News, Va., Child Health Station has opened offices in the building occupied by the American Red Cross. Dr. C. B. Ransome, health officer of Newport News, is chairman of the committee in charge of this work.

Dr. and Mrs. O. L. Watkins,

Rustburg, Va., were recent visitors in Richmond.

Dr. E. W. Perkins

Announces his removal from Reams, Va., to 109 Franklin Street, Petersburg Va.

Dr. E. S. Barr,

Recently medical director of the Philadelphia Hospital for Mental Diseases, at Byberry, Philadelphia, is now connected with Highland Hospital, Asheville, N. C. Dr. Barr graduated from Medical College of Virginia in 1916 and is a member of the Medical Society of Virginia.

The American Association of Obstetricians, Gynecologists and Abdominal Surgeons,

At its annual meeting held in Philadelphia, in September, elected Dr. James F. Baldwin, Columbus, O., president, and Dr. James E. Davis, Detroit, secretary.

Interchange of Health Officers in the United States.

An event which may be fraught with far reaching consequences for world health is the Third General Interchange of Health Officers arranged by the Health Section of the League of Nations which is now taking place in the United States.

Representatives from France, England, Italy, Russia, Poland, Spain, Holland, Belgium, Greece, Yugoslavia, Germany, Switzerland, Norway, Mexico, San Salvador, Brazil, Chile, and Canada, delegated by their respective governments to participate in a course of study and observation, arrived in America the first week in September and will remain for approximately three months. This group numbers among its members many of the most

eminent sanitarians of the world. Until September 22 the delegates remained in Washington, studying national health organization as administered by the U. S. Public Health Service.

Following the close of the course of study of the national health agency, the delegation of visitors separated into three groups, one of which came to Virginia, another to North Carolina and a third to Alabama, where about three weeks will be spent in studying state and local health departments. Richmond, Va., Raleigh, N. C., and Montgomery, Ala., are the Southern cities which were selected for study. From these places the groups will proceed to Massachusetts, New York and Pennsylvania, respectively, for the purpose of studying the health administration in three Northern States and small cities. Syracuse, N. Y., Allentown, Pa., and one of the smallest cities of Massachusetts, yet to be designated, will be visited for a short period. Following this the groups will make a study of health administration in Boston, New York and Philadelphia. Present plans call for a reassembling of the entire delegation in Washington late in November for a final conference.

To Aid Hospital Reconstruction Work in Japan.

Dr. Rudolf Teusler, formerly of Richmond in which place he was visiting at the time of the earthquake in Japan, has returned to Tokyo to aid in the reconstruction work of St. Luke's Mission Hospital in that city, of which he is director in charge. In a communication received by Dr. Teusler before leaving this country, it was stated that all of the American physicians at the Hospital were safe, but no report was made as to the twenty-two Japanese physicians and the eighty nurses at the institution.

St. Luke's Hospital was established in Tokyo twenty-three years ago and was filled with patients at the time of the catastrophe. It is feared that many were killed by the earthquake and in the fire which followed. The foundation of the new St. Luke's Hospital, which had been completed as far as the first floor, was also destroyed.

Dr. Wm. N. Botts,

Appalachia, Virginia, who for the past two years has limited his practice to diseases of the eye, ear, nose and throat, has gone to New York where he will take work in that specialty from October 1st to January 1st, 1924.

Upon his return from New York, Dr. Botts will open at Appalachia, a hospital devoted exclusively to the medical and surgical treatment of eye, ear, nose and throat diseases.

Jewish Maternity Hospital to Have New Building.

The Jewish Maternity Hospital, of New York City, has purchased lots at the northeast corner of Fifth Avenue and 108th Street, New York City, on which it will build a 12-story hospital building with 150 beds. The estimated cost is to be \$1,000,000.

On Democratic Committee.

Drs. Roderick Dew, Woodford, and A. L. Martin, Naulakla, have been elected members of the new democratic committee of Caroline County, Virginia.

Parke, Davis and Company,

Detroit, Mich., announce the appointment of Dr. Earl Miller as Director of the Department of Experimental Medicine, to fill the vacancy following the death of Dr. Ezra Read Larned, who was the originator and organizer of this department and occupied the position as head of the department until his death. Dr. Miller was assistant to Dr. Larned for twelve years and has a wide acquaintance among medical men interested in clinical research work.

Dr. L. E. Fuller,

Recently of Axton, Va., is now located at Witt, Va., where he will continue in general practice.

Dr. R. R. Goad

Advises us of his change of address from Dublin, Va., to Hillsville, Va.

Dr. Leland E. Cofer,

Formerly of Richmond and an alumnus of the Medical College of Virginia, has been appointed director of the division of industrial hygiene of the New York State Department of Labor. Dr. Cofer has been a member of the U. S. Public Health Service for about thirty years and served two terms as an assistant surgeon general in the Service.

Married.

Dr. Russell LaFayette Cecil and Miss Eileen Cumming, both of New York City, September 26. Dr. Cecil was formerly of Richmond, Va.

Dr. Patton K. Pierce, Tuscaloosa, Ala., and Miss Helen Hammer, of University (Va.) Hospital Training School, July 25. Dr. Pierce made his home for a while after graduation at University, Va.

New Surgeon With Woman's Medical College, Philadelphia.

Dr. W. J. Bransfield, a well known surgeon of Philadelphia with a most excellent war record, has been appointed clinical professor of surgery at the Woman's Medical College of Pennsylvania, in Philadelphia.

Medical Section, League of Nations.

Announcement has been made that the medical section of the League of Nations will hold a two weeks' meeting in Philadelphia, beginning November 11. Arrangements for the visit of the delegates is being made by Dr. J. Blair Spencer, director of the Department of Public Health of that city. The program will be of a technical nature and public health problems in all their phases will be studied.

Cancer Campaign.

It was decided that instead of holding a single National Cancer Week this year, a series of six cancer campaigns will be held, one month being devoted to the subject in each of six regions in the United States and Canada. The Virginia campaign will be in force from October 15 through November 14. Our State Society meeting coming at the beginning of this period, it has been decided to have the chairman of the Virginia division, Dr. Robert C. Bryan, Richmond, give a talk on "The Cancer Problem" on opening night of the meeting in Roanoke. The campaign work calls for devoting three weeks in each region to making ready for the campaign and devoting the fourth to carrying out the activities.

In connection with this campaign work, it may be interesting to note that during 1922 there were in Virginia 1,364 deaths from this one disease. The ratio of cancer deaths among the white population is about three and a half times that among the colored population, and the disease is more prevalent among females than among males. From these figures, the need of education in prevention of cancer is apparent.

Dr. Paul C. Colonna

Announces the removal of his office to 42 Park Avenue, New York City. His work will be limited to orthopaedic surgery. Dr. Colonna is a graduate of the Johns Hopkins University Medical School in the class of '20.

Dr. Frederick E. Hamlin,

Staunton, Va., left the first of October to take a two years' course in eye, ear, nose and throat work at the University of Pennsyl-

vania. Upon the completion of this course, he will give up general practice and specialize along these lines.

Dr. Hamlin had made his home in Staunton since 1915 and had many friends in that section. On the evening of September 25, a number of his professional colleagues tendered him a complimentary banquet at Beverley Hotel, as an expression of their high esteem and to wish him Godspeed in his new career.

Miss Rose Z. Van Vort,

After ten years' work at Stuart Circle Hospital as superintendent and principal of the School of Nurses, has resigned to take up organization work. Her resignation will be effective December 15.

The American Medical Editors' Association

Will hold its fifty-fourth annual meeting at Auditorium Hotel, Chicago, Ill., October 25 and 26. Dr. Henry O. Marcy, of Boston, is president of the Association, and Dr. F. H. McMechan, Avon Lake, O., secretary.

Notice to Wives and Daughters of Doctors.

As the Constitution and By-Laws of the Woman's Auxiliary to the Medical Society of Virginia will be formally adopted at the meeting of the Medical Society of Virginia, October 16-19, inclusive, all members of the Auxiliary are urged to attend. Even though delegates have been appointed, every one will be entitled to vote, and a large attendance is desired.

The Bedford County Medical Society,

At a recent meeting, elected the following officers: President, Dr. W. O. McCabe, Thaxton; vice-president, Dr. R. A. Bennett, Huddleston; secretary-treasurer, Dr. J. A. Rucker, Bedford. Drs. W. O. McCabe and J. A. Rucker were elected delegate and alternate, respectively, to the Roanoke meeting.

Location to Exchange.

Wish to exchange Richmond property—new brick buildings in most rapidly developing part of the city (rented for \$2,268 a year) for a doctor's home and small farm in the country. Prefer small neat house in good roads' community, near railroad. Address "Exchange" care this journal. (Adv.)

Wanted Physician.

Richmond doctor wishes physician to take

charge of his practice for the month of November or December. Address reply with references to No. 275, care this journal. (Adv.)

Obituary

Dr. William L. Hudson,

One of the most beloved and prominent physicians of Northern Virginia, died suddenly September 17, while making a professional call. He was stricken with apoplexy shortly after reaching the home of a patient, and expired before a doctor could reach him. Doctor Hudson was born in Luray, Va., 74 years ago and, after completing his academic education at local schools, studied medicine at the Louisville Medical College, from which he graduated in 1874. Dr. Hudson had practiced in Page County for the past forty years and was for a number of years a member of the Page County Board of Health and was also coroner of Page County. He was also for sometime a local surgeon for the Norfolk and Western Railway Company. He joined the Medical Society of Virginia in 1904. Dr. Hudson is survived by his wife and four daughters.

Dr. John Alexander Williams,

A well known surgeon of Greensboro, N. C., committed suicide September 23, in a private sanitarium near Baltimore, by severing an artery in his right leg and bleeding to death. Dr. Williams was fifty-two years of age and graduated from the University of Virginia Medical School in 1895.

Dr. James Widgery Marshall,

Of Leesburg, Va., died at Johns Hopkins Hospital, Baltimore, September 29, following an operation for the removal of a blood clot. He was born in Iowa, fifty-one years ago and studied medicine at George Washington University Medical School, Washington, D. C., from which he graduated in 1901. Dr. Marshall moved from Washington to Loudoun County, Virginia, about ten years ago, on account of his health. Last spring, he went to Vienna, Austria, to take up post-graduate work, which he finished and was on his way home when he was paralyzed. He was brought to the Loudoun Hospital and later taken to Johns Hopkins Hospital. His wife, a brother and two sisters survive him.



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Incidentally, the smiles produced by S. M. A. are not confined to the babies. They are shared by the physician, pleased at the assistance which S.M.A. gives him in his work, and by the parents, whose smiles are of gratitude to the physician.

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Virginia Medical Monthly

OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Fifty-fourth Annual Meeting, Roanoke, October 16-19, 1923.

Vol. 51, No. 8.
WHOLE No. 857.

RICHMOND, VA., NOVEMBER, 1923

\$2.00 A YEAR
20 CENTS A COPY

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RICHMOND, VA., NOVEMBER, 1923

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\$2.00 A YEAR

Original Communications

PRESIDENT'S ADDRESS BEFORE MEDICAL SOCIETY OF VIRGINIA.*

By JOHN STAIGE DAVIS, M. D., University, Va.

Fellow-Members of the Medical Society of Virginia:

My first impulse on this occasion of our fifty-fourth annual meeting is to try to express my grateful appreciation of the great honor done me by election to this office, though I fear that you may yourselves feel some regrets, when you finally escape from the mutual ordeal of this hour.

I wish too to thank my associates in the Council, our energetic secretary and the several committees, whose cheerful and efficient work is responsible for the success of this meeting. The splendid program will compensate you for this preliminary pain.

The regular profession is now confronted in this State with an insidious effort to undermine its prestige and impair its efficiency by bills that will be presented to the next legislature to license various healing cults. We should stand together, Fellows, and use every endeavor to prevent this calamity, which has been victoriously met in several of our sister states.

The letter sent out by our efficient secretary during the past summer sufficiently sets forth our proper attitude. In it is shown that nothing unreasonable is asked. No special school or therapeutic method is discriminated against, but we should insist that all who profess to heal should possess a decent education and know the structure and functions of the human body, which they propose to regulate.

Be sure to see that your representatives are properly posted and their intelligence can be relied upon to direct the right action.

To judge from the perusal of the addresses of my illustrious predecessors on this occasion,

the difficulty I felt in selecting a subject is not unprecedented, as most of them have confessed a similar embarrassment.

MEDICINE IN COLONIAL VIRGINIA appealed to me because of that tendency so strong in those descending the western slope of the hill of life to dwell upon the past. Distance in time as well as space lends enchantment. The subject is not untouched since the revered Dr. W. P. McGuire included some of it in his presidential address before you in 1894 and President Lyon G. Tyler too spoke on certain aspects of it in 1910, and I hereby acknowledge my deep obligations to both; but it seemed to me feasible to view it from a little different angle on this occasion, which I hope you will survive.

It has been said that in all history the man of action comes first with his weapon, then the poet telling of his deeds, and much later the philosopher and scientist.

"Achilles had his Homer, but no Plato or Hippocrates." So the medicine of early days was overshadowed by the triumphs of our arms.

Physicians do not seem to have been very prominent at first as there is no mention of any in "The Declaration of the State of the Colonies and Affairs in Virginia with the Names of Adventurers and Summes Adventured in that Action" (1620). It is described therein "As a Country, which nothing but ignorance can think ill of and which no man but of corrupt mind and ill purpose can defame." The first two medical men who set foot on our soil were William Wilkinson and Thomas Walton, the latter being Surgeon-General of the London Company. They sailed with Captain John Smith in December 1606, and landed in 1607, founding Jamestown the following spring (May 14th, 1607). They first had to subsist on crabs and sturgeon, and suffered much from malnutrition. This was a great and hazardous adventure.

The next year Dr. Anthony Bagnall, Sur-

*Read at fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

geon, appeared and accompanied his colleagues on a voyage to Nansemond, which became the site of Norfolk. He was a great sportsman and with Captain Smith is said to have killed 148 ducks in three shots. At the same time the record tells of Dr. Walter Russell, designated Doctor of Physic, in contrast with previous "surgeons." His first ministrations, however, were decidedly in the latter role, for he was called upon to treat Captain Smith for the wound of a stingray, which he sustained in removing the fish from his sword. Its fin penetrated the wrist an inch and a half and caused such pain and swelling that "we all with much sorrow concluded his funeral and prepared his grave in an island, as himself directed, yet it pleased God by a precious oyle Russell at the first applied to it, when he sounded it with a probe (ere night) his tormenting pain was so well assuaged that he ate of the fish for his supper, which gave no less joy and content to us than ease to himself; for which we called the Island Stingray after the name of the fish." The cure was completed by eating the fish so Captain Smith thus strengthened the popular idea of the virtue of a dog's hair for the bite and lent some support to the homeopathic principle of "*Similia similibus curantur*" as well as to the more modern view of desensitization.

Both of these doctors seem soon to have returned to England—for Smith had later, (1609), to go back there for treatment for wounds due to an explosion.

Dr. Laurence Robertson came two years afterwards (1610) with Lord De La Ware and was made physician general to the colonies and was given 500 acres of land with ten servants to support the dignity of the office. He went on a voyage with Captain Chester, on the Margaret and John, and was mortally wounded in a battle with two Spanish men-of-war, which attacked them. When he fell the captain caught him in his arms exclaiming, "O. what a disaster is this!" and received the noble answer unsurpassed in history, as Dr. Tyler observed, "Fight on brave men—the cause is just and the Lord receive my soul." "Courage, resolve, sense of right, and faith in God find here powerful expression." After his death the London Company selected Dr. John Pott to succeed him. He was a Master of Arts of Cambridge and recom-

mended as well as practiced in Chirurgerie and Physic, and expert also in distilling (a qualification that might be commendable even now). He was made Councillor to the Governor, Sir Francis Wyatt. His experiences were very varied and involved him in several serious offences. In revenge for a treacherous massacre by the Indians in 1622, he was accused of poisoning them for which his enemies at home succeeded in getting him dropped from the list of councillors. As his name was restored two years later he must have been exonerated. In 1629 he became acting Governor during the absence of Colonel West in England, and was the only medical man to hold this office except the first Governor Floyd.

The next year when Harvey became Governor, Dr. Pott was accused of stealing cattle and found guilty, carrying the death penalty and loss of estate! This sentence was suspended by the Governor until the King's pleasure could be learned, as he was declared to be the only qualified physician in the colony. His devoted wife, Elizabeth, went to the Mother Country and so successfully plead his cause before the crown council that the sentence was pronounced "rigorous if not erroneous" and recommended a pardon, which was granted.

In the quarrel about the possession of Maryland, Dr. Pott ardently espoused the cause of the Virginia Colonists and was one of the daring councillors, who had the nerve to arrest the Governor (Harvey) and send him back to England in 1635. For this outrage the King ordered the conspirators to appear before him, but here Pott's name vanishes from the record so it is inferred that he died. Before he left, he had moved from Jamestown Island to a more healthy place called the Middle Plantation, which afterwards became the nucleus of Williamsburg.

The mortality in the colony at this time was terrible—one out of five emigrants was lucky to survive the first year, a period accordingly called the "seasoning" time. Malaria and dysentery were the chief causes of death.

The clergy were really the first physicians and the colony found it necessary in 1631 to pass laws regulating them rather severely, eight years before the Assembly got after the doctors.

The doctors were largely apprentices at-

tracted to Virginia by lack of restriction and pecuniary prospects. The fees were so excessive that masters preferred to let their servants die rather than incur the expense of treatment. This became so bad that the General Assembly passed an act in October, 1639, requiring the doctor in every contested case to declare upon oath the true value, worth and quantity of the drugs administered, whereupon the court would fix the charge. Four other acts were passed (in 1646, '58, '62 and '92 respectively) along the same lines, though the last two seemed to admit some injustice to the doctors and allowed them to add 50% to 100% to the cost of drugs. These acts were designed more to prevent extortion than to exclude quacks and did not at all meet the requirements of the profession.

Dr. Tyler gives an interesting specimen of a bill in tobacco made by a French physician, Mode soon anglicized into Moody:

Geo. Light, Dr., June 20th, 1657.

An Electuary against Vomiting.....	30
A cordial	30
A julep	25
A Glister	25
A Phlebotomy to J. L.	20
A Glister and administering.....	50
A dose of physic	50
A laxative sirup	20
A phlebotomy to ye mayd	20
Stomach powder	40

Tobacco (the currency) cost 12½ cents a pound so that phlebotomy, the cheapest medical operation, cost \$2.50.

As a further example of this kind of thing the following extract is striking:

A VIRGINIA DOCTOR'S MEDICINES, 1729.

(From *Order Book, Richmond County*),
August 6, 1729.

The attachment obtained by Doctor James Black, from Wiloughby Newton, Gent., one of the Magistrates of this County against the estate of Doctor Wm. Bruce for one thousand six hundred thirty-eight pounds of Tob'co, being returned served on the said Wm. Bruce's estate, and the said William Bruce being now called, but not appearing, on the moc'on of the pl't Judgment is granted him against the estate of the said Bruce for the fores'd sum of one thousand six hundred thirty-eight pounds of Tob'co (makeing oath in court it is justly due) with costs and one att's fee als

Exo. The said Return is admitted to Record as followeth:

A List of Medicines attacht for Doctor James Black:

Aq fort 3 V's, Sp't sal arm, ol Cary; Ol Jun, Ol ment, Ol cham, ol pul, Bals hel Ter, Syr Sp Ceoro, Spt Nit Dul, Spt Vit, Pul Cast Rus, Spt Sal, Spt Sal Dule 2 Glass, Lap Contrary, puk (or pub or pul) Lental Rubr, Sal am vel, Gull Gamba, Balls Peru 2 voils, Sal mer Glaub; sp Ceti, Ther Venet 2 Viols, Precip Aur, Arg Vivum, Gum Camp, ol Ther, mer Ruper Precip, pul Gasconi, Tinc Cath, Bals Copre (or Copsie or Capsie) Ol Suc (or Sac) Ol Guf; Gum Scam, ant Drap, Oc Canororum, Torch Echel cane, Alb Rhasis, Fl Benz, Pul grid flors, Turp min'r, Caus Lan, Sal vit, Bals Lucat, Ung Newtritum, Ol anisi, Gum Gall Col Sptt, Emple ple minio, Gum Guiadi Gum my'r, Rad Satery, Lap Calam, Gro: mart. asting, Pul Castory, Cro. Argl 3 p'tt, Sal mart, (Books:) Jo Jonstoni Thaumographia Naturales, Martin ven Dis., Sharps Midwifery, Shaws Physick 2 vol, Septuagint, Bazas Bible, Burroughs Phys, Barbetts Chirurg: January the 27, 1728. Executed me Jno. Hammond S (ub) S(heriff)* (57 medicines, 11 books).

Malaria, as stated, was a terrible scourge along the rivers and swamps where most of the settlers lived.

Nearly a century later Geo. Hain, who settled in Culpeper County, had such a hard time that he solemnly declared that this country was "only fit for Doctors and Ministers." Whether these callings are opposite extremes of a moral series or classified together as the highest and best qualified for the hereafter we are not distinctly informed. Social distinctions were much greater in the 17th than the 19th century when negro-slavery had equalized most white people. In 1673 a tailor named Bullock attempted to run a horse race with a Dr. Matthew Sladen in York Co., and was fined 100 pounds sterling (not tobacco) for the offense. Horse racing was considered a sport for gentlemen only and it was offensively presumptuous for a tradesman to indulge therein. Nothing seems to have been done to the Doctor, who so disgraced himself.

High charges again became notorious and offensive. A certain Dr. Totum in 1681 had the court record the fact that he would not

*Spelling and punctuation have been exactly followed.

visit any patient in York Co., for less than 10 shillings.

The quality of the profession gradually rose in the next forty years, during which time there was no further legislation about medicine. Men with academic degrees began to appear such as Dr. Archibald Blair of York, brother to the founder of William and Mary College. Some are credited with notable contributions, such as Dr. Richard Bryan of King George Co. who was given 250 pounds sterling for the discovery of a cure for dysentery, and Dr. John Tennant, Sr., of Spotsylvania Co., who published a pamphlet on Snake Root as a diuretic and also one on pleurisy in 1736.

In spite of great progress and success the people again began to chafe under the excessive cost and lack of skill of some pretended physicians and in 1726 another act was passed on the subject with the following preamble: "Whereas, they are wont to demand excessive fees and to exact unreasonable prices for the medicine which they administer and do too often for the sake of making up long and extensive bills, load their patients with greater quantities thereof than are necessary or useful, concealing all their compositions as well as to prevent the discovery of their practice as of the true value of what they administer, which is become so grievous, dangerous, and intolerable as well to the poorer sort of people as to others and doth require the most effectual remedy that the nature of the thing will admit." It was accordingly enacted that no surgeon or apothecary, who had served an apprenticeship to those trades, should charge more than certain specified rates, according to distance traveled, which could be doubled by those who had college degrees (thus intimating the value of and giving financial inducement for a liberal education). No remedy was to be administered without at the same time giving the patient an itemized statement of its ingredients and their prices. Surgery was still in the hands of the barbers up to 1745 when what Dr. Tyler calls the "art of barbery" was abandoned by surgeons and socially diverged very widely.

Virginia enacted no further laws on this subject for 150 years and during the Revolutionary War the only legal requirement was the payment of a fee to the state. Nevertheless, the innate love of mankind and the desire to serve his fellows according to the Golden

Rule, served in a measure to protect our calling. The number of university graduates increased until the tone of the profession was largely dominated by them. Some of the more prominent medical men about the time of the Revolution were Dr. Thomas Walker, of Albemarle, the explorer of Kentucky, of whom more later; Dr. George Gilmer, who called himself in his will "Chirurgeon Surgeon"; Dr. John Brodie; Dr. Wm. Pasteur, Mayor of Williamsburg in 1775; Dr. Hugh Mercer, Major General and a hero of the Revolution; Dr. Wm. Carter, who had charge of the hospital in Williamsburg, and Dr. Matthew Pope of the one in Yorktown.

Native Virginians now began to come to the front and many of the wealthier ones selected Edinburgh, Scotland, as the best place for medical study. Twenty-three Virginians did so according to Dr. McGuire. This was probably due to the success of several Scotchmen, who settled in Virginia at the suggestion of George Washington, who had met them in Braddock's army.

Study abroad was not an absolute specific and some exemplified the adage

"How much the fool that hath been sent to Rome
Exceeds the fool that hath been kept at home."

Some honorary M. D.'s were conferred on benefactors, which was then translated to mean *Multum Donavit*: much as LL. D. was thought by some in my early days to mean Laying the Law Down. On the James River canal boats M. D. stood for mule driver!

Dr. John Munson Galt was Surgeon General of Virginia and physician of the first Lunatic Asylum, established in 1772 at Williamsburg, and Dr. James McClurg ranked among the first physicians in America.

In 1761 a small group of Virginia Medical students in Edinburgh formed a club whose constitution was drawn by Theoderic Bland, who with Dr. George Bland afterward held important military offices in the colonies. This instrument consisted of eight articles to which each member pledged himself and is the first recorded utterance on the subject in all history, recognizing the dignity and honor of the profession. So our state may well be proud of it. No one was eligible who did not declare on honor his intention of taking a degree. He had to make it his endeavor for the honor of the profession not to degrade it by hereafter

mingling the trade of apothecary or surgeon with it! Anatomy was affirmed as the true basis of medicine and each member in turn had to teach this branch and give a demonstration of the subject on his own person to the others in his room, whether in repose or action we are not informed! At this time Dr. Bland sent a petition to the Council and House of Burgesses of Virginia on behalf of the Virginia students in Edinburgh, protesting against the unguarded state of the practice in our State "which lay open to the intrusion of every pretender to medical art, who may then practice not less to the dishonor of medicine itself than the destruction of mankind," and asking that the right to practice be confined to those who had been properly licensed and honored with a doctor's degree. Nothing was done, alas. History repeats itself in this day and the danger is again acute.

James McClurg, already mentioned, one of the prerevolutionary graduates of Edinburgh, was sent to Hampton to open the first hospital in America (though a "guest house" for the sick had previously been established opposite Jamestown and called Mount Malado), and inoculate there for small-pox. The son of a British Naval Surgeon, he was a graduate of William and Mary, the University of Edinburgh, and had studied in the hospitals of Paris and London. He wrote an essay on Human Bile which was translated into every European language on account of its original and individual character. In 1779 he was elected to the chair of medicine at William and Mary, authorized that year. It only lasted one session, but was the first attempt to teach the subject in the state and the third on this continent. Dr. McClurg soon afterward moved to Richmond, and was a member of the Federal Convention in Philadelphia, which framed our present Constitution, which, however, he failed to sign. After half a century of distinguished service he died in 1825.

Irritation with an ingratitude to the faithful physician is an ancient occurrence. In 1792 a certain Jacob Rubsamen of Chesterfield County put in his will, "Currey, the quack doctor, has an account against me. It is rascally and unjust." The doctor took a noble revenge by having the clerk inscribe just below the testament a certificate from the eminent Dr. McClurg as to his excellent standing.

After this time without any special law ex-

cept that of decency and simply by the force of public opinion, a regular medical degree became by custom essential to the practice of medicine. Let us see that it is not changed now.

Amongst the distinguished medical men of this time may be mentioned Dr. Nathaniel Chapman of Fairfax County, (1780), who migrated to Philadelphia where he achieved great distinction as professor in the University of Pennsylvania, a prolific writer, first President of the American Medical Association and founder of the American Journal of the Medical Sciences. Ephraim McDowell, (1771) of Rockbridge County studied in Edinburgh and practiced in Danville, Va. He performed the first operation for ovarian tumor and was accordingly called the Father of Ovariectomy. Benjamin Winslow Dudley of Spottsylvania County, (1783), a pupil of Brodie and Abernathy, performed the first lithotomy in this country. He was an advanced apostle of asepsis and attributed his success to the free use of hot water. Several others of great distinction will be referred to later.

The study of medicine in the colonies began at the early age of 14 or 15 when a lad was apprenticed to a practitioner for 6 or 7 years. During this probationary period he was expected to bleed, draw teeth, run errands, compound drugs, attend to his master's horse, if he owned one, and see that it was properly fed and groomed. Every manual effort was unseemly for a real doctor, whose entire work was supposed to be intellectual, so the apprentice fell heir to all physical endeavors. For medical books he could revel in his master's library of possibly twenty volumes. More frequently his learning came from the limited experience of his preceptor or his own.

Colonial diseases are enumerated as age, ague fever, apoplexy, and suddenly bruises and scalde, bleeding, cancer, gangrene, pleurisy, quinsie, and sore throat, and some less refined expressions as dry-belly ache, plagues of the guts and divers sore distempers. Our modern names are more euphonious, but the sensations and sentiments they awaken persist. The rising tide of independence, which culminated in 1776, is shown in the distinction applied to venereal troubles as the King's Evil.

Hygiene was very rudimentary, though Force which also figures largely in the reports.

tells us "There shall no man or woman dare to wash any unclean linen within the Palliza-does. . . norrench and make clean any kettle, pot, or pan within twenty feet of the old well upon pain of whipping."

Ventilation was unknown and during the winter the old dwellings got an odor that was irreverently styled "the prayer meeting smell," a composite perfume in which the barn, the dairy, and the dwelling house, accentuated by perspiring piety, seemed to struggle for precedence. To wash the feet in January was considered a particularly vicious way of tempting Providence. A physician of the times, when asked his plan of treatment replied somewhat poetically:

"First I pukes them, then I sweats them,
Then if they wants to die, I lets them."

Quackery was rampant in colonial days as now. A Boston paper in 1737 contains the following item:

"A young man without any liberal education by living a year or two in any quality with a practitioner of any sort, apothecary, cancer doctor, cutter of stone, bone setter, tooth drawer, (observe the contempt for persons who did anything mechanical), with the essential fundamentals of ignorance and impudence, is esteemed to qualify himself for all the branches of the medical art as much or more than gentlemen in Europe, well born and liberally educated (and therefore modest likewise) have traveled much, attended medical professors, frequented city hospitals and camp infirmaries for many years. How dismal it is to observe some apothecaries shops wainscotted with advertisements recommeending quack medicines for the profit of the shop, but destruction of their neighbors." This is not unfamiliar at this day.

As to therapeutics, the Indians used water and herbs and the Indian Medicine Man was regarded as a sacred intermediary between the Great Spirit and Man. He had to possess four requisites.

1. Recognition of the sanctity of human life. His hands must not be stained with human blood.

An unsuccessful operator might find himself disqualified by this token.

2. His words must never deviate from the truth for the Great Spirit manifests its value in the regular order of nature.

3. He must be slow to anger as God is forbearing.

4. He must be deliberate and prudent of speech.

Even they had quacks, of whom much more is heard. An advertising "healer," a keen observer of human nature, who used his acumen sorely to his selfish advantage.

Chemical (mineral) and Galenical (vegetable) therapeutics divided the doctors into two schools. Famous remedial agents were drawn from most unpromising sources, such as soot, manure, and urine, and human blood. Sow bugs receive most honorable mention. Much reliance was placed on nature to eradicate poisons, so the urine was especially studied and portents drawn from it. When it was black or green, death was inevitable. Urine was a precious extract and one doctor was fined 40 shillings for supplementing a scanty specimen with a personal contribution. The colonists soon heard of and experimented with the properties of dandelion, wormwood, blood comb, and plantain, the last called the Englishman's foot in the belief that it sprang up wherever the paleface trod.

Dr. Carney has collected some gems of medical lore dating back to 1672—such as, picking the gums with the bill of an osprey or a thorn from the back of the dogfish is good for tooth ache. Bear's grease relieves aches and cold swelling. The heart of a rattle snake is an antidote for its bite. Watermelon is good for fevers. "Perilous" coughs are relieved by a mixture of fifteen herbs boiled, cooled, and supplemented by powdered lice. For consumption was advised twelve red garden snails boiled in a pint of milk, which was then strained and drunk on an empty stomach each morning for three months. Hysteria was called "the vapours" and appeared in many puzzling shapes. The patient (suspiciously referred to as "she") has no relish for anything, something seems to rise into the throat and almost stops the breath. She has great heaviness and dejection of spirit. A cloud seems to hang upon her senses. "She is continually out of humor, she knows not why, and out of order, she knows not where." To escape the disorder she must suffer none of the little disturbances and disappointments of an empty world to prey upon her mind and ruffle her sweet temper. The physician was to forbid all sorts of drams and not allow even one pinch of snuff

or a drop of tea, which makes people miserable and "lumpish."

There were no women physicians in Virginia in colonial days, but three attained distinction in New England.

A few words now as to some distinguished medical men of the time and their achievements. Dr. F. J. Corte delivered an oration in Williamsburg, June 12, 1782 on Ancient Medical Philosophy Teaching the New World before the Society of the University of Virginia! This was nearly half a century before it was founded! The third Jewish physician to come to America appeared in Virginia early in the 18th century in the person of Dr. Siccary, a Portuguese and credited by Thomas Jefferson with the introduction of the tomato, long known as the "love apple." He said that whoever could eat enough of them would never die and himself certainly attained a very old age in this faith. Dr. Isaac Levy is the next Jewish practitioner in Virginia (1779-1786), in that wild region then known as "The Illinois Country." He was a sort of combination of merchant, financier, and physician, though he figured repeatedly in the French records as plaintiff for services in the last capacity. In 1782 he sued one Butean, for 100 pounds sterling for his service bill. The defendant claimed he was not entirely cured, so the court ordered the plaintiff to continue his treatment until he was cured on condition that the defendant faithfully followed directions. The doctor soon complained that the patient was disobedient. The defendant explained that he had taken the 60 pills prescribed in two days instead of seven a day as directed in order to be cured more speedily. Whereupon the doctor replied that such a course would have killed him several times over and so got judgment in his favor. Another distinguished physician was Robert Honyman, of Louisa County (1762). His memory was said to be marvelous and he never visited a patient again who questioned his bill. He bequeathed to his son (who was ordered to pass them on to posterity) his diploma, his thermometer (which must have been more substantial than modern instruments) and a rib in his iron chest which had been that of James V. King of Scotland.

After Braddock's defeat George Washington got acquainted with a number of subsequently distinguished Virginia physicians whom he induced to settle in this state. They

were mostly Scotch and fond of Botany. Among them Dr. Hugh Mercer deserves special mention. He settled in Fredericksburg, Va., won high distinction in the Revolutionary War and was killed at Princeton in 1777. His monument is nobly inscribed: General Mercer, a physician of Fredericksburg, Va., "distinguished for his skill and learning, his gentleness and decision, his refinement and humanity, his elevated honor, and his devotion to civil and religious liberty." In 1902 Congress directed that a similar memorial be put up in Fredericksburg, the scene of his professional labors, 125 years after his death. Dr. John Mitchell (1680-1768) while an M. D. was more of a botanist. He lived at Urbanna in Middlesex County and was the friend of Linnaeus, who named the Partridge vine after him—*Mitchella Repens*. A similar honor befell Dr. John Clayton of Gloucester, for whom the Spring Beauty was called *Claytonia*. Another of Braddock's army was Dr. Andrew Robertson, who landed in Richmond County, where he was entertained by a Scotch merchant, whose daughter was ill. Dr. Robertson relieved her and, keeping her in mind, later placed her firmly in his heart, where she reigned as his fourth wife when the favorable opportunity came. He was noted for his distinguished charity and attention to the indigent sick. Dr. Alexander Somervail was another of the group and settled in Essex County, where he is credited with being the first to distinguish typhoid and malarial fevers. Dr. Adam Stephens operated on liver abscess in Stafford County at this time. Dr. Thomas Walker of Albemarle County (1714-94), was the first operator for osteomyelitis. He lived at Castle Hill and was the guardian of Thomas Jefferson. He was the first to explore Kentucky, as already noted, and established the line between North Carolina and Virginia. He died and was buried at Castle Hill "in a grove to which purple Redbud and white dogwood lend in succession the beauty of their vernal bloom and where the oak, tulip tree, and fragrant wild grape make a bower for the birds, which in spring and summer ceaselessly carol his requiem." Dr. William Brown of Alexandria was assistant Surgeon General to the Continental Army. Dr. William Cabell, the founder of the celebrated family of that name, was born at Warminster in England, graduated in London, and came to America in 1724.

After a recall home, he returned in 1741 and went up the James River 50 miles beyond any existing settlement, where he built a house well called "Liberty Hall" near Warminster, which he founded and named after his birthplace. Despite an exalted churchmanship, he was devoted to and kept good race horses on which he was always willing to risk a small stake. He dedicated a portion of his residence to hospital purposes and performed operations there. He had troubles with his neighbors. A Mr. Dickie of upper Tye River, sued him for abusive language. The doctor's excuses were that Dickie had interrupted his survey and even tried to break the chain so he said, "I had to apply the *Words of Solomon to him.*"

Before 1769 the title Doctor was unknown in the colonies. Doctor William Richman was Physician and Director General of the Hospitals in Virginia. June 15, 1776, Williamsburg was chosen as his headquarters. He was afterwards Director General of all Southern Hospitals. He was charged with neglect of duty because the North Carolina and Virginia Troops at Alexandria had smallpox from failure to inoculate, but he was afterwards acquitted. Inoculation was violently resisted at times, and Capt. Walke was almost mobbed in Norfolk in 1753 for taking some of his sailors, who had been exposed to smallpox, eight miles inland to a stockade and inoculating them there. Dr. Wm. Baynham of Essex County was long considered a most eminent surgeon and famous for his accurate knowledge of anatomy. He performed two successful operations for ectopic pregnancy. Dr. James Craig was Washington's chief physician in his last illness and with Dr. Dick, made the celebrated report to Congress as to his refractory behavior to venesection. They took fifteen quarts "in spite of" which they said he died. Some others held legislative offices, such as Drs. Theoderic Bland and Arthur Lee, who gave up medicine for law, and Wm. Jones who were members of Congress. Thacher's history (1828) enumerates 17 specially distinguished physicians in Colonial Virginia and 39 surgeons in the Continental Army.

The poor tone of the profession, which was permeated with quackery, was responsible for the aphorism current at the time (1649), "He that sinneth before his Maker let him fall into the hands of the physicians."

Our forebears were impressed with the

music of the Bull Frogs whose so-called impertinences to the Yankee settlers after the Civil War used to amuse Weir Mitchell. He told me that they seemed to sing, Bull Run, Ball's Bluff, and Chickahominy, and other disastrous memories to the Federal troops. Dr. Schoeff, surgeon to the Hessian troops, observed that our towns had no signs except notices of taxes, elopement of wives, horses stolen, and new doctors settled. He said Virginians were a comely race, but do not give much attention to the exact sciences. "They read, but they do not study." He complained that he had to drink many healths and it was absolutely necessary to drain the bowl, a hardship that some might now bear with resignation if not fortitude.

Offensive advice as to health was once given to General Washington by an interested friend who had a patent medicine to sell. He commenced grandiloquently: "Dear Sir, Health is a grand object with man, but it becomes all important when the preservation of it in any one person comprehends all the relations of a people, when like a focus the views of all direct to a single point. Permit me therefore to lay before you some leading principles, some conclusions, and some consequent practice for the security of health." He then unfolds a remarkable scheme of medication with "Cremer Tarter." It worked as an antacid, neutralizing superabundance in the stomach, and thereby arrested all diseases in their incipency by giving their elements "into the hands of the scavenger to be swept through, properly corrected, so as to be without acrimony to embarrass the way." To this the General responded briefly, thanking him for his "interest" with these words, "Having through life been blessed with a competent share of it (health); without using preventatives against sickness and as little medicine as possible when sick, I can have no inducement to change my practice—against the effect of time and age no remedy has ever yet been discovered, and like the rest of my fellow mortals, I must (if life is prolonged) submit and be reconciled to a gradual decline."

Our Virginia colonial physicians are credited with a goodly number of valuable publications, specially noteworthy of which were an Essay on Polygala Seneca by J. Tennant (1736). "The causes of different colors in people of different climates" and "Letters on Yel-

low Fever," by J. Mitchell, (1743) which was even then considered not contagious, and Flora Virginiana, by J. Clayton (1745). John Jones' work on Wounds and Fractures, (1776) gave him the name of Father of American Surgery. Thomas "prepared" the system by calomel for smallpox inoculation in 1745 in a long paper.

Consultations were unpopular, being chiefly distinguished for gross controversies even at the bedside of the patient. In Massachusetts no operation could be performed "without the consent of all healthy and sober men present, whether doctors or not," and as idle and curious people collected around the sick then even more than now, it can be inferred that there was little surgical intervention.

Courtships were matters of fact not sentiment and required more than "the tautologies of a long winded speech or else the suitor might fall under the contempt of her frown, or his own windie discourse" and "fail to melt with his her crimson lips' disdain!" Belleship of widows is especially noticeable. Debutantes seemed powerless against their fascinations. Washington, Madison and Jefferson, each succumbed to them. An unmarried girl over 25 was regarded as a confirmed old maid and designated as a "pitiabie spectacle"! The extreme youth of the eligibles may account for the attractions of the widows who were more sophisticated.

Jefferson did not seem to approve of hospitals without qualification—he says, "In the care of the sick in the family of a good person, every member is emulous to do them kind offices, where they are visited by all their neighbors, who bring them the little rareties, which their sickly appetites may crave, and who take by rotation the nightly watch over them without comparison better than in a general hospital, where the sick, the dying and the dead are crammed together in the same room and often in the same bed. Nature and kind nursing save a much greater proportion in our plain way, at a smaller expense and with less abuse." Hospitals must have been badly run, as General Washington wrote to Congress in 1776, protesting against the dishonesty and incompetence of many regimental surgeons.

Fellows, I have dwelt thus long and trespassed on your patience because there is to me as I go on in life an ever increasing inspira-

tion and pleasure in the past. I love to contemplate it. "On that deep retiring shore frequent pearls of beauty lie." As Dr. Osler says, "this was the formative period of our existence. This professional ancestry with all of its struggles, hardships, and ingenuity has imparted the impulse which we develop. With the irrevocable past into which they have gone, lies our own future, since our condition is the resultant of forces, which in the intervening generations have molded the profession of a new and mighty empire. From our vantage ground, we can trace in literature how the great streams of our ancestry have blended into the broad current of American medicine on which we are afloat.

"Adaptiveness, lucidity, and thoroughness may be called the characteristics of the Anglican, Gallic, and Teutonic influences we have experienced, and it is our duty to see that these influences whose combination gives to medicine on this continent its distinctively eclectic quality are maintained and extended," and that the torch of healing which these heroic spirits kindled and raised may continue to shed uncontaminated its beneficent rays upon our land. In the words of one of our old professors—"Fresh and fair are the various beauties of our Virginia's natural landscape, but brighter and fairer still are the exalting and ennobling memories of those times, which from worlds not quickened by the sun pour over all her borders the light

'that consecrates
Whate'er it shines upon.'

A BRIEF ANALYSIS OF COUE'S METHOD, AND ITS FALLACIES.*

By J. ALLISON HODGES, M. D., Richmond, Va.

It is a matter of professional opinion as to the advisability of criticising, or refuting the many new and irregular methods suggested these days for the treatment of disease. On the one hand, it is contended that discussion promotes advertisement, and on the other, that proper refutation and denial is demanded of the physician in justice to his patients. Obviously, in cases where wholly untenable claims are made, and it is sought by the proponent to substitute a new method for the old and tried system, whose basic principles have stood the

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test for more than a thousand years, and, moreover, whose elimination may mean the total loss of the element of time, which is so valuable in the treatment of many cases, it becomes imperative, in my opinion, that the regular profession should express its disapproval and denial of such unwarranted and unscientific assertions. Such considerations as these are the excuse for this brief study of Couè's Method, as practiced by him recently in this country.

This method, like all previous pseudo-scientific medical cults, has been the vogue recently, because of the ignorance and credulity of the public in such matters, and because of the fact that there is some distorted truth in nearly every error, or, what is of more importance, the whole truth is not sought, nor taught, and herein lies the great fallacy of Couè's method and teaching.

His basic principle is suggestion, in which all scientists concur in degree, but he authoritatively asserts that this power is only efficient through auto-suggestion. In other words, while he says that "from our birth to our death we are all the slaves of suggestion," yet he proceeds to say that in order to secure self-mastery which he denominates as "Health," we must "discipline suggestion, and direct it in the way, we ourselves wish." Later, however, he teaches that not "wishing," but "the imagination" is the instrument wherewith the all powerful tyrant of suggestion is conquered, and that we become masters of ourselves, entirely through ourselves, not by wishing nor willing, but by imagination, initiated and made effective wholly and solely within ourselves, that is, with no outside suggestion whatever, not even from Couè himself. May I ask, in passing, how the countless thousands that have gone before, have maintained health without this knowledge, or how the thousands that shall follow that know nothing of this special Couè brand of treatment shall survive?

The preceding statements are sufficient to show how garbled truth may be utilized by the empiric to the detriment of scientific teaching, and to the glory and benefit of the blatant advertiser of a new cult.

But to be more specific, it may be well to consider very briefly the power of suggestion, as it is exemplified most usually in hypnotism, or mesmerism, and note if there are any differences perceptible or demonstrable between these

procedures, and the method used by Couè.

The phenomenon of hypnotism is mystical, but interesting. In my opinion and from observation of the methods of such notable scientists as Charcot, and others, I am convinced, speaking in a popular way, that the mental states during such a process are entirely passive and quiescent, all the faculties of the mind being in abeyance to the directions of another, and that it is necessary only to be able to concentrate and hold the attention of the one hypnotized, and while so absorbed, either by looking at you, or while holding his hands clasped, or otherwise, and this mental state is further tested by some command, such as to evoke a question of the hypnotized person's ability to do, or not to do, such and such an act, and then the dominating personality of the person hypnotizing is directly stamped upon the other's mental state, and the hypnotized patient finds that nothing can be done, except as directed or inhibited by the hypnotizer himself, that then the hypnotic state is complete; in other words, the patient for the time being is mentally vacant, except for the faculty of attention, and is so absorbed in that act, that the hypnotizer can readily impress his personality and directions upon him, thus, for the time being, completely dominating him. If, however, the patient is not able to concentrate totally, and thus put the brakes on his other mental activities, he is incapable of being hypnotized, while on the other hand, if he can give absolute and perfect attention, he can be hypnotized, for the mental machinery for the time being is inactive, dormant and receptive, and subject to external direction by another. In addition, if the patient wishes and believes that certain things can be accomplished, he is that much more willing to be mentally influenced, without bringing into play any of the dominating faculties of his mind. It is in such a state as this, that *willing* to do a thing, is its virtual accomplishment, for willing is to a remarkable extent dependent upon wishing, and wishing, when intense, breeds power. Again, should "the wish or desire be the enemy of the will, nothing can be accomplished until this desire shall become the will's ally"; in some cases, this can only be produced, by the use of the imagination, correctly speaking, the representative faculty, and it can be accomplished by depicting vividly to yourself the sad consequences, for example, that would occur if

the habit was not broken, and at the same time, picturing to yourself quite as vividly the happy consequences that would ensue from the breaking of it. This is the only instance in such mental processes when the imagination is of use and, if diligently exercised, a sincere wish of freedom from a vicious habit will develop, and out of this wishing will grow effective willing, and the possible amelioration or cure of some functional disease, or acquired evil habit. When this does not occur, Bruce says that nine times out of ten, perhaps oftener, contrary desire (or wishing) and contrary belief, account for ineffective willing.

Monsieur Couè uses exactly the same procedure that is used by the hypnotist, except that he says he requires his patients to suggest to themselves while conscious, whereas he maintains the hypnotist suggests to his patient while the patient is unconscious, but if this be true, why the need for any set formula at all? This distinction seems to me to be a difference without demonstrable proof, but it is upon this theory that Couè announces his dogma that self-mastery is health and the cure of disease, and that imagination, not the will, is the instrument through which conscious auto-suggestion accomplishes it; in other words he bases his cure upon the power of the imagination, and not upon the will power, and yet on page 14 of his new book, "My Method," he writes as follows:

"I cannot too strongly insist that in the practice of auto-suggestion, the exercise of will must be strictly avoided, except in the initial phase of directing or guiding the imagination on the desired lines"—an admission, which to my mind nullifies the basal facts of his teaching, for how can he so definitely limit the imagination, and autocratically say to the will: "thus far, and no farther shalt thou go?"

If his directions to the patient, or his management of the patient, or his suggested mumbo-jumbo formula, "every day in every way I am getting better and better," drawled twenty times like a litany, and in order to avoid distraction of attention, even having the patient count off the numbers on a piece of string tied in twenty knots, is a whit different from the method of hypnotist, I am incapable of appreciating it, for, in addition, he seems to forget entirely that the patient is not receiving an auto-suggestion, that is, a suggestion personal to himself and born within himself, as

he claims, but that he is receiving suggestions from the outside, else why should the patient recite the formula, which bears the brand of Couè, or why should he count the beads in a certain and regular way?

On the contrary, this is but a Couè trick, in order that while the patient's attention is directly engaged, he himself may stamp upon the receptive faculties of the patient's brain, the facts he desires to plant, so as to produce the desired harvest. In fact, it would seem, that, like others, he thinks that every method has tricks but his own, and yet he finds it necessary time and time again to proclaim "I am no healer!" and yet proceeds to heal!

He quotes Pythagoras and Aristotle as believers in the power of imagination, but even though he appeals to the oracles of the ancients, and says in his writings, but mind you, not to the patient, "Don't concentrate, but just leave it to the unconscious," yet he can adduce no authority for the statement, that imagination is more powerful than the will, although he explains that Caesar and Napoleon succeeded in battle because of their great imagination, and so it was left to him, who is a meek man and like Uriah Heep, "an humble man" to discover a great discovery, namely, that imagination makes even character, and besides, heals almost all diseases, thus making Couè, the discoverer of this fallacy, a new prophet of a new creed. In accomplishment, the human will has always been considered the prime factor, and it is unnecessary to name some of the highest authorities in the scientific world from the time of the great logician and philosopher, Sir William Hamilton, to the present day who believed and taught exactly the opposite that Couè teaches, and yet I mention to you his own countrymen, Dr. Paul Du Bois who teaches that self control is secured by strengthening the will, and Dr. Jules Payot who shows the means possible for will training and the result of linking your will with work, and thus securing physical and mental efficiency, and also Dr. Charles B. Patterson, Dr. Alfred Schofield, and H. Addington Bruce, whom I have quoted, all proving the power of will over imagination, even to the point of emphasizing the practice of medicine, as being largely "the will to be well."

Unfortunately, the writing of many books has been this author's undoing, for his work, "Self Mastery through Conscious Auto-Sugges-

tion" both by title and precept does not appeal to the "unconscious," while in "My Method," just off the press, p. 7, he writes that "the subconscious is dominant over the conscious" also. In the first named book, he does not directly claim to cure diseases that really exist, but in his last, he names specific and organic diseases (pp. 37-43), which can be cured by auto-suggestion, namely, ulcers of the stomach, tumor of tenth rib, diabetes, sciatica, asthma, wasted tissues repaired, tuberculosis benefited, sinusitis (after eleven operations) cured, etc.—all of these patients having "directed their subconscious minds to the idea of healing" through auto-suggestion, and yet, he was no healer!

The most amazing statement of Couè, however, is his method of influencing and healing the infant, and his directions to the parents:

"The latter (parents) should wait until the child is asleep, and then one of them should enter his room with precaution, stop a yard from his bed, and repeat fifteen or twenty times in a murmur all the things they wish to obtain from the child, from the point of view of health, work, sleep, application, conduct, etc. He should then retire as he came, taking great care not to wake the child. This extremely simple process gives the best results, and it is easy to understand why. When the child is asleep, his body and his conscious self are at rest and, as it were, annihilated; his unconscious self, however, is awake; it is then to the latter alone that one speaks, and as it is very credulous, it accepts what one says to it without dispute, so that, little by little, the child arrives at making of himself what his parents desire him to be."

"I say with all kindness," says Dr. Wylie, "that any one who can possibly believe such a statement to be true must not only annihilate his will but also his conscious intelligence and degrade himself to the condition of an individual who would accept a statement which has neither reason nor science connected with it in any way. In other words, it is the prefection of inane credulity. The hallucinations which have been expounded in this country by such men as Sir Arthur Conan Doyle seem like beams of radiant light and intelligence compared with a statement of this kind."

Dr. Couè says anybody can suggest to himself to get well. What kind of a formula would any one suggest? What shall one sug-

gest who has never heard Couè? Is his the only "get-well-quick" formula?

It is useless, however, to pursue this subject further, when upon the fly-leaf of one of his volumes, he informs the gentle reader that "with a little practice, the physical or mental distress will have vanished in 20 to 25 seconds," a result that would require the suspension of all the laws of Nature, and yet, he was no miracle-worker! In my opinion, if any diseases were healed by this magician, untutored and unlearned in medical science, as he proudly and cleverly proclaims, they were diseases, or rather the idea and habit of diseases, that the patients did not have, but may have thought they had, for science has never yet demonstrated that "suggestion" under any "syndicated" name, can cure any disease that actually exists. If, as Couè says, any one can suggest to himself to get well, what formula, will be necessary? If you take Couè's formula, at whose suggestion are you doing it, at yours, or his? But, "mark well, I am no healer!" (p. 5, "My Method.")

In conclusion, it would seem that it is vain to hope that conversion from error, as we see it, by means of argument, will ever rid us of cormorants that feed upon the profession and its clientele, but let us at least express the wish, as we cherish the hope, that if there be "rank weeds in the garden of science, that when they have done their permitted mischief and rotted, they may serve to manure the soil which they have dishonored, and show that, in the plans of Providence, the vilest things are not without their purpose!"

107 East Franklin Street.

MEDICAL AND SURGICAL IMPRESSIONS OF SOUTH AMERICA.*

By P. W. BOYD, M. D., Winchester, Va.

The purpose of the cruise to South America by some members of the American College of Surgeons was:

1st: To hold in the principal capitals of South America a series of scientific meetings that would seal more strongly the mutual friendships of the surgical professions of North and South America.

2nd: To observe and study first hand scientifically equipped medical schools, hospitals, and institutions of tropical medicine.

*Read before the Medical Association of the Valley of Virginia, at its meeting in Winchester, May 31, 1923.

3rd: To enable the Fellows of the College and their families to take an ideal winter trip into the fascinating tropics and semi-tropics of our southern continent, at a time when our own continent is buried in winter.

For the cruise, the College selected and chartered the S. S. Vandyck of the Lamport and Holt line. Wiser choice of a steamship could not have been made. Each member was furnished with ideal accommodations with every facility for entertainment and enjoyment during the cruise.

We left New York February, 10, 1923, about noon, in the midst of a snow storm. By the next day the climate had changed and one could note the warmth from the Gulf Stream. By the third day we were dressed in summer clothing and went in swimming.

Our first stop was Havana, reaching that port about 6 A. M. A committee of surgeons from Havana visited our ship and invited us to shore to visit the hospitals and points of interest. We were tendered a reception in that city by President Senor Dr. Alfredo Zayas at his palace. He was assisted by his wife and the newly appointed United States Ambassador Gen. Enoch H. Crowder. We were in this port only twenty-four hours.

February 18th, we reached Cristobal. As soon as our ship docked, a committee of surgeons came aboard inviting us to visit the Canal Zone and Panama. At eight thirty we took the train at Colon for the fifty mile trip across the Isthmus. The first stop was at Gatun where we inspected the great lock and dam—the most wonderful construction one can imagine. A large British ship was just going through the lock and we had the privilege of seeing her pass through. We crossed the Canal on the bridge of the gates and passed over the breast of the dam which makes the Gatun Lake by damming up the Chagres river. This floods a great part of the valley and backs up against the continental divide. The lake surface is 85 feet above sea level. The dam is 8,400 feet long, one-half mile wide at the base and slopes gently to a width of 100 feet at the top and 105 feet above sea level. At the center of the dam is a wonderful spillway of 14 gates. The surface of the dam has been planted with grass and shrubbery. On the east wing is a nine hole golf course. All along we could see beautiful tropical flowers. We spent about one hour at Gatun Lock, then boarded the

train for Gamboa at the northern end of the cut. The railroad runs around the edge of Gatun Lake. We could see how the water had inundated the swamp, making the huge lake of fresh water from which the cities of Colon and Gamboa get their water supply.

At Gamboa we took a steamboat and passed through the cut as far as Pedro Miguel. The channel of the canal makes a number of turns and is about 300 feet wide in the cut, 42 feet deep in the Atlantic sea level section, 45 feet deep in the lake section including the cut, 45 feet at Pacific sea level. Beside the cut at several places was shown how the hillside had slid into the Canal, by dredges constantly at work. There are buoys and lights all along the channel so that a boat is as safely convoyed through by night as by day.

At Pedro Miguel we entrained for Panama and were driven to Hotel Tivoli for luncheon. This hotel is built upon a hill and is approached through a beautiful street on each side of which were wonderful royal palms, roses and other flowers of brilliant reds and purples.

A most impressive ceremony during the trip took place at Panama when the stone laying ceremonies at the General Gorgas Memorial occurred.

This ceremony took place Sunday afternoon in the presence of a throng of citizens of the Panama Republic and upon a site facing the Pacific Ocean. Upon this site will be built the buildings for the Institute of Tropical Medicine as a memorial to Gen. Gorgas, commemorating the wonderful work he did in making it possible to build this great Canal. The ceremony was presided over by President Senor Dr. Belisario Poiras, who delivered an address suitable to the occasion.

After this we visited the wonderful Ancon Hospital, one of the oldest landmarks of the Canal Zone. It came into existence in 1883 and has been intimately connected in building the canal under both the French and American regime. It is the hospital where nearly all the military and civil people are sent when in need of hospital treatment. Many persons from the Central and South American Republics seek admission for treatment, so its renown is more than local. One of the surgeons from Cartagena stated they usually sent to Ancon such operations as gastro-enterostomies and that type. The old buildings were of

frame construction, of pavilion type, tile roofing and unscreened.

It may be interesting to recall that many cases of minor injury and illnesses admitted to the hospital developed yellow fever within a short time after admittance. A large percentage died. The records show that in six years, 1,200 patients died in the old yellow fever ward known as St. Charles. It is believed that more people died in this ward from yellow fever than in any other building now standing in the world. It is strange that a noble act and love for things beautiful should result so disastrously to those for whom it was designed to benefit, as will be demonstrated by the following incident.

The Sister Superior of Ancon Hospital was a lover of flowers and attempted to make the grounds a beautiful garden of plant life. There exists on the Isthmus an ant known as the "umbrella" ant, so called because it carries bits of leaves umbrella fashion. To prevent destruction of the plants by these ants the flowers were surrounded by a low concrete wall with a narrow, shallow gutter filled with water over which the ants could not navigate. These pools of fresh water were ideal places for breeding the yellow fever mosquito, so that the patients admitted to the hospital located in the beautiful flower garden became victims of these disease producing mosquitoes.

Americans took charge of the Ancon Hospital in May 1914. Since then the United States Government has built extremely beautiful buildings, the most attractive group from an architectural point of view being the one comprising the new Ancon Hospital supplanting the original wooden buildings. The style of architecture is the modified Italian renaissance; plan adopted is the pavilion, structure reinforced concrete, all roofs are covered with red tile, inside walls and ceilings concrete, plaster painted with a washable paint. Porches and outside openings are copper screened against insects. The floors are six inch red tile in the wards. The four operating rooms are white hexagonal tile. Laboratory and diet kitchens are on each ward, some kitchenettes and small dining rooms for ambulatory patients.

The rates for the private rooms are \$7.50 per day; ward rates \$5.00 per day. They can accomodate 1,200 patients. However at this time there were only 350.

Our visit was about 9 P. M. I could not imagine such quiet in a hospital. All lights out, nurses on duty going about their work with flashlights. At the present time there are 75 graduate nurses employed. They have eight-hour duty. There are separate wards for the different colored peoples, yellow, black and white. Each ward is separate in every respect as to baths, laboratories, diet kitchens, etc. Ancon Hospital is by far the best one we saw in South America.

At Caracas we visited the hospital connected with the Medical College. The building is one story and built upon the pavilion plan, painted yellow and blue with red tile roof. We entered the driveway, passing through the large iron gate into a court yard, and from here into the administrative building, offices, etc. Leading off from this court yard we went from one ward to the other through a covered corridor with sides open. On either side are beautiful tropical plants and flowers of all kinds. The open corridors are about 100 feet long and lead to the various wards.

We first visited the gynecological ward which was well filled, then the obstetrical and surgical wards. The beds were pretty and white, wards clean, painted light green, with tiled floors. The sterilization is done by high pressure steam boiler. They use up-to-date sterilization equipment of the Swiss type. A group of medical students accompanied us through the building and were quite an intelligent looking bunch of young men. The operating room and some of the wards were screened but the majority of the wards were not. We saw no female trained nurses.

The hospital at Trinidad is located in beautiful grounds. The exterior of the building is most attractive, two stories high and built upon the same pavilion plan. The wards are very long, 80 x 40 feet, and divided by a railing 2½ feet high going across the room. This divides the medical and surgical wards. Everything is very clean but old fashioned. The operating room is the only part of the building screened. Since it is nice and warm it is not necessary to have window glass so every thing is wide open, except the operating room. The equipment is only fair. There is a wonderful X-ray building, but no X-ray equipment at all.

An English nurse is acting superintendent and under her native black women, rather

elderly, at least 40 or 50 years of age, are caring for the patients. The food served was a horrible messy looking porridge or soup. The beds in the wards were very far apart and clean. The most attractive ward was the children's. Here the cribs were screened by mosquito netting. The obstetrical wards joined the children's, adjoining this is a nice, fairly well-equipped delivery room. Off from this was the typhoid ward well filled, there being considerable of this disease present. One hundred feet away was the tubercular ward, holding about 50 patients.

The most beautiful place we visited was Rio de Janeiro. The setting God gave to this city to make it beautiful cannot be described; it must be seen to be appreciated. The people of Rio are cordial. It is more of a residential than a business center, though there is a great deal of shipping from this point. Ships from all over the world can be seen in the harbor.

The first medical institute visited was the Oliver Cruise Institute for Tropical Medicine. We visited the laboratory and Museum of this Institute where we were shown the beetle, eggs and larvae that caused Chagas Disease. The Oliver Cruise Institute is about eight miles in the country. The buildings are handsome and well arranged. Practically all the laboratory work for the general hospitals of Rio is done here, specimens being sent there each day.

From here we visited the Misera Cordio, Rio's largest municipal hospital of 1,500 beds. The building like all large hospital buildings in South America is built on the pavilion plan with corridors on each side and large openings into these corridors but no screens. Some of the windows have window lights with here and there blue glass. The purpose of this blue glass was to keep out the flies. They claim a fly will not go by such a light, though the wards were full of flies. I counted as many as ten on one bed. We were shown through by an old French doctor and an English nurse. The hospital is under St. Vincent's Sisterhood. The wards were clean and well filled. In the surgical ward we saw some interesting work—one Albee graft for Potts' Disease, of three months' duration, which had healed by primary union, with good result; a number of interesting fracture and abdominal cases. The medical wards were full of patients. They are given much medicine which is placed by the patient's bedside and they are allowed to take it as they desire. The wards are clean and fairly well

cared for. Have no female nurses in charge. The female patients are cared for by maids; males by orderlies.

The laboratories are well fitted though most of the work is sent to Oliver Cruise Institute. The X-ray equipment is elaborate and of modern type. The records are well kept. They use the card index system. The bedside records are quite full and well kept. The kitchen is unusually good with modern ranges and equipment. The hydrotherapy plant was most complete, being in a separate building. There are two pools for sea water baths, (water being piped at least one-half mile from the bay), electric, turkish and shower baths, etc. The patients are all sent to this building for hydrotherapy treatment, even douches.

The San Francisco Hospital of 250 beds located in a beautiful part of the city has been recently remodeled. It looks more like an American hospital than any we saw. The wards and operating rooms are screened. It is in charge of five American nurses who are attempting to start a training school employing native women, though the better class of women do not take up training as they consider it a menial occupation. Most of the equipment of the operating room is of French design as the Portuguese lean strongly toward the French. Many of the doctors go there to study. We saw the chief surgeon, Dr. Vas, do an appendectomy and an hysterectomy, both of which were skilfully and well done. Anesthetic used was ether. Our impression of the San Francisco hospital was quite pleasing.

One of the visiting nurses, Miss Dawson of Canada, employed by the Rockefeller Institute, took us to the leprosy hospital. We saw in all South American cities leprosy hospitals or colonies. This one in Rio is located close to the bay. The building is quite large and handsomely constructed, every thing tiled and white paint. Where there are any window panes they are of blue glass. There were about 90 patients in the hospital at this time, in all stages of the disease. One poor fellow had lost both legs and walked on boots turned backward, i. e., the toe of the boot; he was also blind in both eyes. They went about the ward at will, a number of them blind, others with legs, arms and fingers gone, and others with sores all over their faces and hands. The patients would follow us about and were very curious. Evidently they had few visitors.

The hospital was well cared for, every thing being scrupulously clean, though we saw no places of amusement. Flowers were planted in the patios, shower and tub baths in any quantity. In the dining room for the blind was a table built in the shape of an X so they could get their food more easily. One patient who was confined to bed had been in the hospital for 24 years.

We visited in Santos the Santo Casa de Misera Cordio hospital. Connected with this hospital is a cathedral founded in 1543 which is still a part of the building. Dr. Gomahey showed us through and was very courteous. The wards are large, holding about 50 patients, and are fairly well furnished. The beds are of white enamel. Spread over the foot of each bed is a red blanket. There were patients in the beds, many on pallets beside the beds and on the floors in the corridors. Many of them had uncovered cuspidors by their sides, literally covered with flies. The medicines were in glasses or bottles by their sides and could be taken by the patients at will. There were medical and surgical wards, men and women, of course, separate; whites and blacks in the same wards. The hospital is managed by a sisterhood.

There are two operating rooms well equipped with modern sterilizing apparatus, one French make, the other Kny-Scherer. There was quite a variety of instruments, bone and laparotomy especially. The X-ray laboratory was equipped with German transformer, fluoroscope, high frequency, violet rays and all modern electrical equipment. The kitchen was modern in every way. Floors and side walls were of tile; there were large ranges and cooking utensils. Every place was clean, the room having been just flushed out with water. Lying on the tables were about 100 freshly dressed chickens literally covered with flies. Close by was a fine incinerator and steam sterilizer for sterilizing bedding.

On the fifth floor of the hospital, which is up against a high hill, is the tubercular ward which accomodates about 100 patients and is separate in every way from the other wards. This has been recently built and is entirely modern especially as to ventilation. The doors and windows open out on to a veranda, from which one gets a beautiful view of the city below and the harbor with the Santos mountains in the distance. We were taken up to the ward in an elevator which refused to work

when we came down, so we walked down the stairs on the side of the hill through a court yard. Every where tropical plants, flowers and trees, making quite a pretty picture.

The greatest need in the hospital is the female trained nurse. The patients receive practically no nursing and after the operations get but very little care. The post-operative patients are never given enemata or sedatives. Patients are nauseated and have gas distention and are uncomfortable to a degree. I am sure they must lose numbers of patients they would not if they were given proper treatment. In this hospital the private wards were very few and unattractive.

I do not think South America can equal North America in surgery or medicine but in research work they are ahead of us, in some instances doing wonders. We visited the snake farm at Sao Paulo which is a most interesting place. The laboratory is quite a handsome building and has all modern equipment. The stables contain quite a number of horses to be used for the laboratories. A number of men are employed in this institution. There is an enclosure where they keep the snakes. We were told that snakes would not multiply in captivity, and they live but a short while, as they will not eat. It requires about 1,000 snakes a month for this work. These they obtain from the natives who trap them and bring them to the institute and sell them. In Brazil there are about seven different varieties of rattlers beside other kinds of poisonous snakes. The keeper goes among them fearlessly and does not hesitate to pick them up at will. He has a stick about three feet long with a piece of metal on the end at right angles. This he places back of the snake's head holding him on the ground, then reaches down with the other hand catching him by the neck. The virus is obtained by holding a glass dish in front of the snake; when he strikes, he spits out the virus in the dish.

The efficiency of the serum was demonstrated to us. Some of the snake's venom was injected into a pigeon which died in one minute. Another pigeon was given a dose of the serum, then some of the virus that was used in the other pigeon and he was not even made sick. The person who has been bitten by a snake should have the serum as soon after being bitten as possible. Whenever any one goes into the interior he is advised to carry the serum with him.

The prettiest and best equipped private hospital we visited was the Sanatorium Castro, Buenos Aires, owned by Dr. Castro. The superintendent, an elderly gentleman, and the chief nurse, a Sister, showed us through. The building cost \$250,000.00, is attractively furnished and fitted up with the latest equipment in all departments, X-ray, other laboratories, operating room, etc. The rooms were en suite consisting of a large room with two beds, small sitting room and private bath, all very well furnished. In the larger room one bed is for the patient, the other for a member of his family who usually accompanies the patient to the hospital and assists in nursing and caring for him, for, as in most of the hospitals in South America, you do not see the trained nurse. The cost for such a room is \$18.00 per day. We did not see any operations at this time.

At Alvear Hospital, one of the largest municipal hospitals, we saw a clinic conducted by Drs. Sole, Propelo, Valdez and San Martin. This was most interesting.

The majority of the surgeons in Buenos Aires use spinal anesthesia.

In the large operating room of Alvear Hospital, which is on the first floor, we saw three operations going on at the same time; one for hydatid cyst of the liver, one for duodenal ulcer, and the third for amputation of the leg just above the knee. In none of these cases was spinal anesthesia satisfactory, as in each instance the patient had to be given chloroform to complete the operation. The operations were done skilfully and quite rapidly. There were no trained nurses to assist and each operator was assisted by a doctor who was an interne. The surgeons prepare the patients and instruments. The patient is brought to the operating room shaved, but there is no other preparation. They use iodine as we in North America do in preparing the site for operation. The surgeons use very few instruments. Solutions and dressings are handed him by an orderly who seems very proficient. This day we saw four operations for hydatid cysts, two of the liver, one of the lung, and one of the transverse colon. This disease seems to be very prevalent in Argentine.

One of the most skilful surgeons we had the pleasure of meeting was Dr. Artemeo Zeno, professor of surgery at Rosario Medical College. Dr. Zeno speaks English as well as

French quite well. Besides being an M. D. he has a B. L. degree.

The Medical College is well built and wonderfully well equipped, the building being only two years old. They have every facility for teaching medicine. The anatomical laboratories, not only in this school but in others we visited, are very interesting, as they teach regional anatomy by transverse and longitudinal sections of the body. Specimens are kept in large glass jars. In some instances bodies of adults are thus preserved. The specimens are wonderfully well prepared.

All medical schools have a six years' course but, owing to the number of holidays, which is more than fifty a year, the total number of school days is no more than our four years' course. They have adopted the clinical method of teaching. For this purpose each college has connected with it a large hospital.

In Montevideo we saw some very interesting work in block anesthesia which was most satisfactory. We saw an operation for hydatid cyst of the lung. The operation was done in two stages, a portion of the rib over the site of the cyst was excised and, as the pleura had not adhered to the lung at this part, the surgeon soaked a piece of gauze in iodine, then squeezed it out as dry as he could, packed it into the wound upon the lung. This was to be left in ten days, thus producing adhesion between the lung and pleura. After this time the cyst was to be aspirated.

In Uruguay we saw a number of cases of goiter. Quite a number were operated upon while others were being treated by administering blood obtained from sheep which had had their thyroid glands removed three months. They were bled and the blood mixed with equal parts of glycerine, which is a preservative and will keep in stock for several weeks. Two drams of this is given three times a day. The surgeons claim many cases are thus cured without operations.

In each country we visited the medical profession extended us cordial greeting and their hospitality was genuine. Some of these surgeons have visited the American clinics but most of them attend the French and German ones.

Quite a delightful feature of the cruise was the scientific meetings held aboard the ship during our voyage. Every other day for an hour interesting papers were presented. These

papers and the discussions following were very instructive and beneficial.

The visit could not have been better planned or more profitably conducted. It was certainly delightful.

THE FAMILY PHYSICIAN IN THE PUBLIC HEALTH PROGRAM.*

By MARY EVELYN BRYDON, M. D., Richmond, Va.
Director Child Welfare, Va. State Board of Health.

I have come before you, the family physicians of Virginia, to report what your Bureau of Child Welfare has accomplished during the past five years since it began work under the State Board of Health; to bespeak your interest and sympathetic co-operation with the program which is going on in the State; and to get your assistance in perfecting our future plans.

You have no doubt many times in the past few years been consulted by parents accompanied by children bearing in their hands printed notices which had called the parents' attention to some physical defect in the child, discovered by a teacher in the schools, or by a clinician at a community conference of parents of infants and preschool children. Did you give a passing thought to the agencies which caused these parents to consult you?

One of these active agents so interested in the health of school children is the teacher. It is her duty to co-ordinate the teaching of personal hygiene and community health with instruction in other subjects, and it is primarily to the interests of this work that she be fully cognizant of the present status of the health of her pupils. In order to acquire this knowledge at first hand she has been intrusted with with such part of the annual physical inspection of the pupils as lies within her power to perform.

The enrollment of school children last year in the rural schools of the one hundred counties of Virginia was 356,153. Of these 272,688 were inspected by their teachers. The physical defects thus brought to light were reported to the division superintendents who in turn reported to the State Board of Education. By a careful study of the figures you will note that approximately 60% of the rural school children were found to have some defect obvious enough to be detected by a lay observer.

The West Law, passed in 1918, resulted in establishing school inspection in Virginia and provided for the following points:

First: Employment of school nurses;

Second: Employment of physical education directors;

Third: Training of teachers in physical inspection, school hygiene and physical education;

Fourth: Physical inspection of school children.

Prior to 1918 little had been done in the State for child welfare outside of a few cities and a few counties. Such cities as were trying out medical inspection of schools were employing a few physicians on part time, and a few graduate nurses with little public health training, to demonstrate this health work. In the counties little other than a few surveys and demonstrations had been undertaken.

The West Law required that all of its provisions to be undertaken by either the State Board of Health or the State Board of Education should have the approval of the other. The State Board of Health was the first to take the initiative and, although the Act carried no appropriation, straightway employed a physician to undertake the task of carrying out the provisions of the Law.

The training of teachers in health education received attention first. During each of the first two years after the passage of this law, five lectures were given in the summer schools and in as many of the winter normal schools and colleges as the one person employed could visit. These lectures, ten in number, were made into a course, and a correspondence course of twelve lessons was offered by the State Board of Health. Before another year passed, a demand had arisen for this health educational training to be put on a college basis, and the course was raised to a minimum requirement of thirty-six hours in the normal schools and colleges. This course in Health and Physical Education was given last year in eight normal schools and seventeen accredited colleges of the state, and 1,928 students received this instruction as a necessary preparation for entering the teaching profession in Virginia.

The course itself, both for the normal schools and for the Correspondence Course, was most carefully worked out. The several parts were submitted to specialists in the various subjects

*Read by title at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

and all carefully supervised by both State Boards.

The course consists of three main divisions:

1. Physical defects and their control;
2. Communicable diseases and their control;
3. Health Education which includes:

First Aid and Prevention of Accidents,
Care of School Plant,
Personal Hygiene,
Physical Training,
Mental Hygiene.

Side by side with the development of the teachers' training courses in Health and Physical Education in the normal schools and colleges, there developed in the state school system the desire for putting into effect the health training thus received. At first the sentiment was toward the employment of school nurses and doctors to do this part of the work, but the recruiting of nurses was too slow and the scarcity of doctors brought the realization that, if children were to have their defects discovered and corrected, the teachers would have to do most of the inspection. Furthermore, it was soon noted by the teachers themselves that while the inspection devolving upon them gave them more work in the school, the results were gratifying in that they became not only more conversant with the physical side of the children themselves, but such inspection as they were able to do formed a basis upon which they could build their health instruction in the schoolroom. This plan was also productive of getting more parents interested in the health of their children and in having children's defects corrected. One of the outstanding criticisms that this part of our work has had to face has been the confusion in the minds of the medical profession, as well as in the minds of the educational authorities, in regard to the definition of the words "physical inspection."

When we decided to ask the co-operation of the teaching profession, it devolved upon us to differentiate carefully between the terms "medical examination" and "physical inspection." Teachers, physicians and other well informed people might protest that teachers as a class are not able to make physical inspections with any degree of accuracy. That is indisputable if by the term "physical inspection" is meant such an examination as would be made by a trained physician; but it does not

require years of training in medicine to determine whether a child's sight is obviously defective or his hearing impaired. An ordinarily intelligent person can determine whether a child is a mouth or nose breather, and knows that if exclusively the former, there is something wrong, requiring medical attention. The distinction that is made between "inspection" and "examination" has been illustrated by the simile of a person buying a desk. The prospective purchaser looks the desk over, feels it to see if it is well finished, opens the drawers to see if they run smoothly, pushes against it to see if the joints are solid, etc. That is inspection. If it is found that one of the drawers will not open properly, or that there is a rough place on the surface that will interfere with writing, he refuses to buy it until it has been sent to an expert cabinet-maker. This expert "examines" the desk and determines the cause of the defects and institutes the proper measures for repairs.

The ideal plan would be for each child to have annually a complete medical examination, given by his family physician. If this could be done, the work of the teacher in the schoolroom would be a sinecure as far as inspections are concerned. Her work under those conditions would be directed solely towards training the child in maintaining his health by inculcating health habits. But as we appreciate the present impossibility of realizing this object, we utilize the teacher for a simple inspection in the schoolroom. Then, when those defects which are so apparent that they may easily be recognized are discovered, the parents are notified of the necessity of taking the children to their family physician who is thus enabled to "examine" them and effect the necessary corrections.

The inspection consisted from the first of only a few essential points. The teacher is required to weigh and measure each child, determine if he is underweight by comparison of his present weight with the table printed in the manual of instruction; test his vision by the eye chart supplied for the purpose; test his hearing by the conversational voice at twenty feet, and look at his teeth. Teachers are not required to look at tonsils. This is the work of the school nurse. Not only is complete instruction for making the inspection given the teacher during her training, but full instructions are sent out yearly from the State

Board of Health office, and all county teachers' institutes have been visited each year where it is possible to send a speaker on this subject. After doing the inspection, the teacher records on proper cards her findings of each child. These she keeps as a record for the school. She is also furnished with the special form—which you have seen—on which she records the defects found, and these she sends to the parents of her respective pupils.

There are two admitted difficulties in the way of physical inspection by the teachers. One is the suspicious attitude of the parents; the other is the unwillingness of the teacher to undertake the work. Both of these difficulties are due to misapprehension of the facts.

It is natural that parents, like other people, will not believe that a layman can do the work of a professional; but the answer to that objection is: We do not ask a layman to do professional work. Our physical inspection is so simple that anyone intelligent enough to be a teacher will be sufficiently intelligent to make the required inspections.

The other objection also vanishes with a comprehension of the work and its relation to the ordinary duties of the teacher. Many teachers have been distinctly unwilling to undertake this new work; but few, if any, have remained unwilling after they have been made to understand how they can aid in the physical well-being of their pupils, and the extent to which health and strength contribute to mental development.

We do not claim that our teachers are infallible. It may be that some of them regard this health work as an auxiliary of education and not as a part of it, and that others are too scrupulous in making inspections. It may be that an occasional teacher will suggest remedies for defects, although they are cautioned against doing so. It may be that sometimes a teacher may make the mistake of sending a child to the doctor for treatment when treatment is unnecessary. But these exceptional instances do not weigh against the mass of favorable experience.

We are now working toward an end that will, if reached, reduce still further the demands upon the teacher. We are striving to have all children made physically fit before they enter school; and we hope for the day when the majority of the patrons of our public

schools will have their children receive medical examinations regularly.

In some of the counties in Virginia plans are already being worked out by the health authorities to provide for the inspection of children of preschool age and the correction of defects during the summer previous to the opening of school.

Our fundamental proposition is that all authority over the class-room should be vested in the teacher, and that to introduce a doctor or nurse as a temporary authority is subversive of that proposition and fundamentally unwise.

We have chosen to consider the child as a unit, neglecting no element of his personality. We attempt to provide for his normal development, physically, mentally, morally and spiritually. We try to keep constantly in mind the relations of these factors in development; and we believe that the child's guidance, other than that given at home or by the church, should be left, so far as possible with one person. If that be a proper conclusion, the obvious director must be a teacher.

In 1919-20, 31,161 children were inspected in fifty counties; in 1920-21, 127,187 children were inspected in seventy-seven counties; in 1921-22, 193,099 children were inspected in ninety-two counties; and in 1922-23, 272,688 children were inspected in one hundred counties. You will note that there has been steady improvement in the number of children inspected as the years have passed until this past year. Every county and every city reported some inspection.

The West Law required that all of its provisions undertaken by either the State Board of Health or the State Board of Education should have the approval of the other. This requirement has been strictly adhered to from the first.

This work is now in charge jointly of our State School Nurse and the State Rural Health Supervisor, the latter being employed jointly by the two state departments. As we see it, Health and Physical Education does not end with the detection of defects. Not only must the defects be corrected but the child must be taught the personal application of health in the school-room.

This is being done through

1. A daily inspection by the teacher for symptoms of common diseases as well as for cleanliness of person and teeth;

2. Hygiene instruction provided for in the curriculum;

3. Physical Training.

The direct follow-up work in relation to the physical inspection of school children is done by the public health nurses of whom we have forty in thirty-four out of one hundred counties in the state. However, the teachers in innumerable instances where they have no nurses have interested themselves in getting this part of the work done, realizing as they do the tremendous advantage in having physically fit children to teach.

The correction of defects with which the Child Welfare Bureau has been directly interested has been developed mainly through dental clinics. One of the results of physical inspection which first attracted public attention was the appalling number of dental defects. The Bureau, having in the second year of its organization received an appropriation for the school work, employed a dentist on full time to develop this part of the work. Little headway was made at first but after getting the co-operation of the State Dental Association and demonstrating the need for the correction of dental defects to the school authorities in the rural districts, school dental clinics have become part of the health propaganda in a large number of our counties as well as in a few of the larger cities. Last year our state dentist employed for the work on full time ten dentists; on part time one dentist. In these clinics 21,349 children obtained an opportunity to have their mouths put in order.

The reports that have been received from twenty-nine county nurses show that 22,913 children were corrected last year as a direct result of the physical inspections by school teachers. You have probably seen all these children who required treatment other than dental, because the letter on the back of the notice to parents directed them to go to their family physicians or dentists for examination and treatment.

Little has been done for those children found to be underweight of whom there are 50,000. This year, however, demonstrations in nutritional classes are contemplated and much benefit is hoped to accrue for this service.

This gives you very briefly an outline of the clinics and other correctional methods with which the Child Welfare Bureau has been con-

cerned during these past few years following the physical inspection by teachers. But the clinics and the other correctional measures put on by the county public health nurse have been serving as temporary measures while the people, the public, the school authorities, the physicians, and the parents were slowly awakening to the real policy that underlies the facts in the case. The theory that lies at the foundation of all these health measures consists of certain fundamental principles:

First: It is the parents who should assume the whole responsibility for the health of their children;

Second: The family physician is the only trained authority on this subject accessible to them and he should have constant supervision over the health of the whole family, but particularly over the pregnant mothers, infants and preschool children;

Third: No parent should allow a child to enter school any year of his school life until his physical fitness to receive his education has been ascertained by his family physician.

It is therefore necessary that both the family physician and the parents understand the relationship that they bear to each other and that the terms of this relationship is not a matter of dollars and cents, important as that is from an economic standpoint, but a matter of the health of little children; the health and efficiency of the future citizens of Virginia.

To bring this very self evident fact to the attention of both the family physician and the parents, an added feature in the program was developed. This was made possible by the acceptance by the Legislature in 1922 of the Sheppard-Towner Act providing for the promotion of Maternity and Infancy Welfare. This soon developed the idea in the minds of those charged with carrying on this phase of health work that all work dealing with the health of school children should start with the child in prenatal life. To this end activities were directed towards reducing the infant and maternal death rate and towards the establishment of health ideals among parents and guardians of children.

It is estimated that 33.4 per cent of the 70,000 births in Virginia are delivered by midwives. Fully two-thirds of the more than 5,500 midwives in the state are colored and are in the main ignorant, dirty and superstitious. To eliminate the worst, to train and

supervise the best, and gradually to raise the standard, a supervisor of midwife education was employed and, in the one year that the work has been organized, forty-six classes have been held in twenty-seven counties with an attendance of 630 midwives. Most of them are illiterate, therefore the training they can receive must necessarily be simple. They are taught first of all the four things the State requires the midwife to do before she can charge for her services:

1. Secure a Midwife Permit at once from the local registrar and sign the Pledge Card;
2. Obey the Safety Rules on the back of the Permit;
3. Register every birth before ten days;
4. Put two drops of one per cent nitrate of silver solution in the eyes immediately after birth.

They are also taught the fundamentals of cleanliness and whatever obstetrical information they can assimilate.

We realize the need for intensive prenatal work, but this Bureau has not yet undertaken that phase of the work, except that a Correspondence Course for Mothers is being established by which it is hoped mothers may be trained in the care of themselves before and after childbirth, thus giving the child a fair start in life. Recently, the physicians of the state were sent a general outline of this course together with a copy of the first lesson and a statement apprising them of the purposes of the course. Those of you who looked over this material, I am sure, received the idea that such a course will go far towards eliminating the midwife and, by training the mothers in the fundamental principles of personal health, the physicians will have a more intelligent group of mothers to care for and the maternal death rate will be materially lessened.

Even before this Bureau received Federal Aid for promoting maternity and infancy welfare, it was felt that there was a crying need all over the state for bringing to the attention of the parents their own responsibility in the prevention of disease, the correction of defects and the training of infants and preschool children in proper health habits. Therefore, to demonstrate this point, child welfare conferences have been conducted in many communities. During the past year 1,877 children under six were given medical examinations. Parents were asked to bring well babies to the

conference and no child was examined except in the presence of the mother or guardian. Every mother had to give the name of her family doctor and the individual records of the examination were sent as far as possible to their physicians. The records were explained to the parents and they were advised to visit their family physicians regularly. Thus the doctor may be able to correct defects and to give advice in regard to keeping the child in a physically fit condition.

The reports of nurses and others doing follow-up work indicate that much interest has been aroused by these clinics and that more attention is being given to the health of the child under school age.

It is, therefore, to the family physician that the Bureau of Child Welfare turns for sympathetic co-operation in the reduction of the maternal and infant death rate, in preventing sickness among infants and preschool children, and in maintaining the child's health. Every family with children should be under the supervision of an all-around practising physician. It is to this family physician that the mother is being directed for advice in regard to herself and her children before they get sick.

Child hygiene work, as thus seen, is a big problem and one with a diversity of interests. Our plan is still in process of evolution as are all human efforts worth while. There are difficulties to be overcome but we are optimistic about these and are looking forward to the realization of our ultimate aim: the day when *every* mother assumes the responsibility of the health of her family under the guidance of her family physician and *every* school child—white and colored, city and country—in the State of Virginia is in a physically fit condition.

1110 Capitol Street.

INSULIN IN DIABETES MELLITUS.*

By ALEXANDER G. BROWN, Jr., A. B., M. D., Richmond, Va.
Associate Professor of Medicine, Medical College of Virginia.
Internist, Stuart Circle Hospital.

Insulin (Lilly) has been released. This extract of the islets of Langerhans in the pancreas has been tried out, and the clinical observations made upon its action in the human diabetic have been summarized and have been recently placed before the profession. For a year, now, this extract has been subjected to

*Read before Richmond Academy of Medicine and Surgery, May 8th, 1923.

careful testing in the hands of selected clinicians. A few clinics in this country and Canada, under the general control, by agreement with the Lilly Research Laboratories, Eli Lilly and Company, have been supplied weekly with Insulin. The data obtained, the results secured, conclusions reached, have been collected. Each clinic is now permitted to place the findings of the investigation before medical associations and to publish the same for general dissemination.

It is needless to commend the Toronto group and its collaborating Research Laboratory of Eli Lilly and Company for the high ground they have taken in this scientific inquiry. Their caution and wisdom in handling this new product, which so immediately gripped the public mind and which received such widespread broad-casting in the lay press, met every requirement of the highest professional standards in scientific procedure.

Insulin is an aqueous solution of the active principle from the islets of Langerhans in the pancreas. The story of its discovery may be briefly told. Dr. F. G. Banting and Mr. C. H. Best, a second year medical student, of the Department of Physiology in the University of Toronto, under the general guidance of Prof. J. J. R. Macleod of that University, with other collaborators, during the year 1920-1921, evolved this new pancreatic product. The hypothesis upon which the investigation took shape came from the thought in Banting's mind that, as the acini but not the islets of Langerhans degenerated after the ligation of the pancreatic duct, an extract of the islets may be obtained. This ground-thought started the train of investigations. The ligation of the pancreatic duct of a series of dogs was performed. After ten weeks the pancreas was taken out. Healthy and unimpaired islands were found, although the acini were destroyed. From these, the extract was made. On July 30th, 1921, the experiments with the extract obtained were begun. Four cubic centimeters of the extract were injected intravenously in a partially depancreatized dog (blood-sugar before injection was 0.20 per cent): (a) one hour later it was 0.12 per cent; (b) two hours after the injection of the extract, 20 grams of a stomach tube. At the end of five hours the animal excreted only 0.2 grams, whereas the same depancreatized animal, prior to the inglu-
cose was introduced in the stomach, through

jection of pancreatic extract, had in the same period of time excreted 16 grams following the use of 25 grams of glucose. This, together with other confirmatory experiments, pointed out rather clearly, that the extract exercised a reducing influence upon the percentage of sugar in the blood and consequently upon the amount excreted in the urine.

Banting and Best performed a further series of experiments with the resulting conclusions: (1) that extract from the whole pancreas of a normal animal would reduce blood-sugar, but that it was weaker; (2) that boiling made the extract useless; (3) that extract was destroyed by pancreatic secretion itself, and (4) that introduction of it in the rectum was attended by no effect on blood-sugar.

A great advance was made in quantity production by the discovery, in November 1921, that pancreas of the fetal calf, of less than five months' development, possessed no secretory function, but possessed islands of Langerhans with interal secretion. From the fetal calf pancreas, then, large quantities of pancreatic extract were obtained, without the destruction of the gland itself; and this was used subcutaneously rather than intravenously in reducing the blood-sugar of a diabetic dog from 0.30 per cent to normal and in rendering the urine sugar free. The subcutaneous method was found to be slower in getting-in, but its effect was much more prolonged, in its reducing effect.

The further advance in the development of insulin was a discovery that 0.7 per cent solution of tricesol did not harmfully affect the active principle of the extract, and that the active principle was obtainable from the fresh tissue of the pancreas with 25% alcohol. By this method it was found possible to get the active principle from the entire gland. This extract was potent in its effect in reducing the blood-sugar of a diabetic dog from 0.35 per cent to 0.08 per cent in three hours, making the urine sugar free.

The next step in the development of insulin was the production of a soluble extract which could be administered subcutaneously without fear of producing a local or systemic reaction. By the assistance of Professor J. B. Collip such a potent soluble extract was produced. This was done by eliminating to a minimum protein, lipid, alcoholic soluble constituents, and there was left a product free of salt, which

was isotonic and capable of being passed, for sterilization purposes, through a Berkefeld filter. This extract was Insulin.

It was necessary to find out the potencies and dangers of this new agent. It was important also to observe any by or ill effects of the potent principle. So insulin was tested on normal rabbits. It was tested on rabbits with hyperglycemia, caused, (a) by puncture of the floor of the fourth ventricle, (b) by the administration of injections of adrenalin and (c) by asphyxia.

(a) The normal rabbit, with blood-sugar of 0.167 per cent, was given 4 c.c. of the pancreatic extract. In thirty minutes blood sugar had fallen to 0.137 per cent; in two hours to 0.065 per cent. In three and a half hours the animal showed symptoms of rapid breathing, dilatation of pupils, protrusion of eye balls and convulsive movements, the animal tossing itself from side to side. These convulsive seizures occurred about every fifteen minutes. Fifty minutes after convulsions began, the blood-sugar was found to be 0.028 per cent. At this point in the experiment the animal was injected subcutaneously with four and a half grams of pure dextrose in a one per cent solution. In six minutes, the rabbit improved; in 10 minutes it was sitting up and hopping around; next day the animal was hyperexcitable; in four days, although taking food, normally died of convulsions. Post-mortem of the rabbit showed the pancreas was atrophied.

(b) In the next experiment 5 c.c. of the extract was administered subcutaneously to an animal with a blood sugar of 0.129 per cent. In forty-five minutes the blood sugar was 0.077 per cent. In three and a half hours, the animal showed similar signs as presented in the previous experiment. Five grams of dextrose in 30 c.c. of water was subcutaneously injected, and in five minutes the rabbit was apparently restored to normal, although the blood sugar had fallen to 0.056 per cent. The blood sugar rose for a short time and then declined, and in three hours and fifteen minutes, the animal was in convulsions.

From these experiments it was concluded that the level of sugar in the blood at about 0.045 per cent in 1 kilogram rabbit was always attended by convulsions and this phenomenon was taken as a unit-measure of insulin. Rabbits were also rendered hyperglycemic by

puncturing of the floor of the fourth ventricle. In five perfectly normal rabbits hyperglycemia was produced by this method and there resulted a remarkable increase of blood sugar; in one case 0.46 per cent was attained, while two rabbits, treated in like manner, previously injected by suitable amounts of insulin, showed no increase of blood sugar. Also, by the administration of one c.c. of 1-1000 solution of adrenalin a marked increase of blood sugar was produced. But similar injections of adrenalin, in animals previously treated with insulin, showed blood sugar below normal and in cases treated simultaneously blood sugar remained about the same or slightly above normal.

(c) In asphyxia experiments the animals were gassed; two rabbits were subjected to 45 minutes of gassing: they were allowed to rest for a week and gassed again; one rabbit after the first gassing showed a blood sugar of 0.35 per cent; after the use of the insulin, the second gassing was followed by so great a fall in the blood sugar that the animal died in convulsions.

INSULIN IN HUMAN DIABETES.

On January 10th, 1922, Banting and Best administered the first injection of insulin in human diabetes. By February 22, 1922, seven cases were under treatment. The observations made on diabetic animals were reproduced in diabetic humans. The fall in blood sugar and the rise in respiratory quotient with the return of normal blood sugar level were observed and acidosis disappeared. Symptoms of patients were relieved. Patients improved clinically. In November, 1922, Professor Macleod's paper on "Insulin and Diabetes" pointed out that enough clinical study of the treatment of diabetes by the subcutaneous administration of insulin had then been made to justify the statement that when insulin is administered subcutaneously in adequate dosage it is capable, within a remarkably short time, of removing the cardinal symptoms of the disease for a period of several hours. To suppress the symptoms permanently, however, the injections must be repeated, the practice at present being twice or thrice daily. So long as the administration is maintained, the patient is able to assimilate more carbohydrate than without it, and he gains in weight, in physical and mental vigor, so that the despondency and apathy, so prominent in those cases, disappear.

Macleod further states that whether the diabetic's condition is in any degree cured by the rest which is given to the damaged pancreatic function by insulin cannot yet be stated. It is perhaps in the adolescent forms of the disease that these results have been most marked, he adds, but there can be no doubt that when insulin comes to be more available its exhibition along with intelligent control of the diet will have the same beneficial results in all serious forms of the disease.

Macleod further says that in cases of threatened coma its value is undoubted, and this is also the case when it is used as a precautionary measure against post-operative risk in surgical practice.

PREPARATION ON A LARGE SCALE AND ITS PROTECTION FROM COMMERCIAL EXPLOITATIONS.

Realizing that the publication of the discovery of insulin and its remarkable effects in improving diabetes might occasion a widespread demand for the product before adequate study of it had been made and before standardization and quantity production had been brought about, the Toronto group proceeded to safeguard the production and to standardize and regulate its distribution through this probationary period by applying for patents covering its production and to hand these over to the University of Toronto, which should assume the function of censuring approved manufacturers. Patents were applied for in Canada, the United States, Great Britain and other countries. The committee of the University, because of unexpected difficulties in producing a non-irritating preparation of insulin of constant potency by the Collip method, when made on the large scale production in the Connaught Antitoxin Laboratories, decided to collaborate with a firm engaged in the manufacture of extracts from slaughter-house material. This firm agreed, for clinical purposes, to distribute a sufficient number of free samples of their preparation to various physicians specializing in the treatment of diabetes in properly equipped clinics. This collaboration between the University of Toronto and this firm continued under the terms of this agreement to such period as was required to study clinically the large scale production of insulin by these widely-distributed groups.

GENERAL COMMENTS UPON INSULIN.

Dosage.—The unit of insulin is the amount

required to lower the normal blood sugar of a one kilogram rabbit to 0.045 per cent, at which point convulsions generally occur. This unit when injected into a human diabetic will enable the patient to utilize or store from 1 to 4 grams additional carbohydrate, depending on the severity of the case. The Research Laboratories modified these statements by notifying physicians using the product that too great reliance could not be placed in this standard unit because the uniformity of the product was not established, but later, about January 1923, certain concentrations were made, and a more uniform product was produced. The first insulin which we received was accompanied by these comments from Lilly. "The Iletin with which we are now supplying you is a concentrated preparation containing 8 units to the cubic centimeter. Each unit is capable of causing combustion of from 2 to 3 grams of sugar in the diet." Dosage of insulin is expressed in units, as before said.

The Method.—It is customary to give injections subcutaneously of insulin, one-half to an hour before the principal carbohydrate meals, once, twice or three times daily according to the blood sugar, and the plan adopted for the carbohydrate distribution in the daily regime of diet. The remarkable power of lowering the blood sugar by insulin makes necessary great caution in its administration. In severe cases, when it is necessary to give 24 to 20 units a day for any period of time, it is desirable to keep a close watch on the blood sugar. In mild cases in adults it is better to use small injections, say 10 units before each meal, or 5 units before each meal, according to the needs of the patient. In the case of coma when the blood sugar is high and the patient is in extremis, intravenous injections of 100 to 150 units in the space of 24 hours have been given, using hour-doses and observing carefully urine examinations and the repeated blood sugar examinations, as well as the clinical course of the patient's symptoms. When the coma is profound and the blood sugar is very high, as in one case that came under our observation with blood sugar 0.58 per cent, hourly subcutaneous injections of 10 units were given, properly guarded by repeated investigations of the blood sugar and the urine for sugar.

In mild adult cases 10 units given subcutaneously before principal carbohydrate meal will enable the patient to increase the carbohydrate

limit in the diet and keep the blood sugar near normal level, which will make for a better general body tone and well-being.

Dangers.—Insulin when given too long before a meal or in too large doses causes a lowering of blood sugar below a normal level, hypoglycemia. This condition is dangerous and is characterized by such acute symptoms as a sense of weakness, nervousness and sweating, followed by unconsciousness which may end fatally. Delirium or convulsions may occur in hypoglycemia. This condition may be quickly overcome by the immediate ingestion of some forms of carbohydrate such as orange juice, glucose, or cane sugar. When in a coma, glucose or sugar may be administered by the mouth through the stomach tube; if the patient's condition seems critical, 5 to 20 grams of glucose may be injected intravenously in a 5 to 50 per cent sterile solution. This use of carbohydrate gradually returns the blood sugar to normal and the patient improves. Subcutaneous use of 5 to 10 minims of a 1 to 1,000 solution of adrenalin chloride may be used in hypoglycemia and may obviate the necessity for an intravenous glucose injection.

Laboratory Control.—The administration of a product that may so quickly alter the blood of its normal sugar, must be carefully and cautiously controlled by laboratory examinations. The continued administration of insulin should be checked by periodic and repeated blood sugar estimations and by daily examinations of urinary sugar. If the laboratory control is not possible, more caution should be exercised in its administration. The urine examinations that are characterized by periodic or transient glycosuria are safer than urine examinations with total and persistent sugar-free results. It is better to have a higher than normal blood sugar with only slight loss of urinary sugar, than to have a persistent and constant sugar free urine and a too low blood sugar of an unknown level on account of infrequent laboratory tests for blood sugar.

Insulin an Adjunct to Diet.—Insulin is only an adjunct to the dietary management of diabetes. It can not be considered a cure for diabetes. It is a great and potent product which can be used in connection with an adjusted and selected diet for the control of an excessive hyperglycemia and its attendant poisonous manifestation. Its discovery and practical use mark a new era in medicine be-

cause it gives the physician the use of an internal secretion which may be applied to the rescue of a patient from a serious condition; to enable the patient to increase the use of carbohydrate without producing an excessive hyperglycemia, and to help mild cases to reach a near-cure by quickly and completely assisting the carbohydrate mechanism and in this way enabling it to return to its normal function before irrevocable damage has been done. The same precautions of careful diet and searching study for focal infection should be followed whether with or without insulin.

Personal Experience With Insulin.—It will be recalled that in a former place in this communication, it was stated that the Toronto group were collaborating with a limited number of selected diabetic specialists in this country and Canada. At the time I had under treatment a number of cases of diabetes, but all of these were yielding to the management followed in diet. One of my cases, which had been classified as a severe type, had gone off to "Christian Science," had abandoned all dietary restrictions, and was relying altogether upon "prayer," "faith," and unrestrained ingestion of every sort of food. Realizing the advantage that would accrue to the patient with whom I was in touch through the family, I made request to Toronto for a supply of insulin and received a letter saying the request could not be granted immediately on account of the shortage of insulin but that Lilly & Company would send some insulin at earliest possible date. Fortunately, Lilly, on November 16th, 1922, started sending me 200 units of insulin each week. In this way my service at the hospital began to receive weekly shipments of insulin. It has been used by me practically daily since that time. Attention is called to the case report of the first patient on whom insulin was used in Stuart Circle Hospital:

CASE REPORT.

Mr. F. M. Reg. No. 10-1710, Medical Service, Dr. Alexander G. Brown, Jr., Stuart Circle Hospital.

White, male, age 29.

Occupation—Wholesale clothier, admitted November 15, 1922.

Family History—Father living, age 59, health fair. Mother living, 59, health fair (diabetes); two brothers, health good; five sisters, health good. On admission patient's condition is poor. He breathes with difficulty; he is emaciated; he is weak; his mental state is stupid and he appears to be on the verge of coma.

C. C.—Weakness, nausea and fatigue; dyspnea; semi-comatose condition.

Present Illness—About 18 months ago patient had an excessive appetite and great thirst; was voiding large quantities of urine; was weak and unable to attend to business. Came to hospital and after treatment left with urine sugar free. Two weeks later was injured by auto, sugar reappeared and has continued. Was in hospital twice after that; states that his tolerance was injured. On leaving hospital after last time his appetite increased and he ate anything he wanted; was treated by Christian Science. Now he is very weak; has shortness of breath and is exhausted on slightest exertion. Appetite poor; thirst less than formerly. Has some dyspnea. States that he has recently had pains in joints while on protein diet.

Past History—Childhood diseases: Never had any serious sickness, though he has always felt weak and not up to normal. States that nine years ago this trouble began, but that he got along all right until eighteen months ago.

Central Nervous System—Is nervous, irritable, does not sleep well.

Physical Examination—General appearance is that of an emaciated, rather nervous individual, who is very weak and depressed, suffering with air hunger. Skin yellowish, dry, slightly roughened, warm.

Head, normal in size and contour.

Eyes react, freely movable, conjunctivae reddened.

Mouth: Tongue red. Mucous membrane red.

Teeth show evidence of much repair. Gums reddened but do not appear to be swollen.

Thorax moves uniformly on inspiration.

Lungs: Breath sounds clear, but increased and noisy in quality.

Heart regular in rate and rhythm. Sounds are decreased, no murmurs heard.

Arterial radial pulse small, regular, easily compressed.

Blood pressure, 100/58.

Abdomen, flat-soft, no areas of tenderness or rigidity.

Kidneys and spleen not palpable.

Liver one finger below costal margin.

Extremities negative.

November 15th. Urine was loaded with sugar, acetone and diacetic acid; his blood sugar was 426 mgs. per 100 c.c. of blood.

November 16th. Iletin, 8 units every hour, was given hypodermically and frequent urine examinations for sugar were made, without obtaining any change as to sugar or diacetic acid.

November 17th. 10 units of Iletin were given every hour with an examination of urine made half hour afterward, without obtaining any marked change in laboratory findings but with noticeable improvement of patient's clinical side.

November 18th. Iletin, 10 units, was given the patient every hour very early in the day. Urine sugar began to noticeably diminish. Following the fourth dose on this day the collected urine showed that it required 40 drops of urine to 5 c.c. Haines' solution to produce sugar reaction. Acetone and diacetic acid very faint trace. No more was given that day. Blood sugar was 168 mgs. per 100 c.c. of blood.

November 19th. Iletin, 10 units before lunch and supper. Urine, 2 drops to produce sugar reaction, acetone and diacetic acid very faint trace.*

November 20th. Iletin, 10 units before breakfast and supper. Urine, 10 drops to produce sugar reaction, acetone and diacetic acid faint trace.

November 21st. Iletin, 10 units before breakfast, dinner and supper. Urine, 7 drops to produce sugar reaction, acetone, diacetic acid negative.

*Three urinalyses were made daily at this time.

November 22nd. Iletin, 10 units before breakfast, dinner and supper. Urine, 7 drops to produce sugar reaction, acetone and diacetic acid moderate amount.

Diet adjustment estimated on basis of 130 lbs., weight 59 kilo. Per diem: 32 grams carbohydrate. 42.5 grams protein; 210 grams fat.

November 23rd. Iletin, 10 units before breakfast, dinner and supper. Urine, 2 drops to produce sugar reaction; acetone and diacetic acid negative.

November 24th. Iletin, 10 units before breakfast, dinner and supper. Urine, 2 drops to produce sugar reaction; acetone and diacetic acid, faint trace.

November 25th. Iletin, 10 units before breakfast, dinner and supper. Urine, 6 drops to produce sugar reaction; acetone and diacetic acid, faint trace.

November 26th. Iletin, 10 units before breakfast, dinner and supper. Urine, 2 drops produced sugar reaction; acetone negative, diacetic acid moderate.

November 27th. Iletin, 10 units before breakfast, dinner and supper. Urine, 12 drops, produced sugar reaction; acetone, very faint trace; diacetic acid, very faint trace.

November 28th. Iletin, 10 units before breakfast, dinner and supper. Urine, 100 drops produced sugar reaction; acetone and diacetic acid, very faint trace.

November 29th. Iletin, 10 units before breakfast, dinner and supper. Urine, 24 drops produced sugar reaction; acetone, negative; diacetic acid, negative. Blood sugar, 153 mgs. per 100 c.c. blood.

November 30th. Iletin, 10 units once a day. Urine, 50 drops produced sugar reaction; 35 drops produced sugar reaction, acetone and diacetic negative; 5 drops produced sugar reaction, acetone very slight trace; diacetic acid, negative.

DIET—DETAILS OF THE DAY.

8 A. M.	Grams	Proteins	Fats	Carbo- hydrates
Apple	90			12.8
Broiled fish	82	16.4	5.8	
Bacon	88	12.8	37.5	
Cream, 20%	78	1.95	15.6	3.5
Butter	15		12.75	
Coffee		----	----	----

Noon—Iletin 10 units, hypodermically, whiskey, $\frac{1}{2}$ ounce.

1 P. M.	Grams	Proteins	Fats	Carbo- hydrates
Turkey	50	14.2	9.2	
Butter	25		21.25	
Cauliflower	75			
String Beans	75			
Spinach	75			7.2
Tea		----	----	----

4 P. M.—Whiskey $\frac{1}{2}$ ounce.

6 P. M.	Grams	Proteins	Fats	Carbo- hydrates
Turkey	90	25.6	16.6	
Bacon	50	7.3	21.3	
Butter	50		42.	
Fish, broiled	40	7.8	2.8	
Lettuce	50			
Sauer Kraut	75			
B. Sprouts	45			
Celery	50			7.3
Tea		----	----	----

8 P. M. Whiskey, $\frac{1}{2}$ ounce.

December 1st. Iletin, 10 units once a day, noon. Urine, 12 drops produced sugar reaction; 18 drops produced sugar reaction; acetone trace, diacetic acid trace.

December 2nd. Iletin, 10 units once daily, noon.

Urine, 10 drops produced sugar reaction, acetone and diacetic acid, faint trace.

December 3rd. Iletin, 14 units once daily, noon. Urine, 2 drops to produce reaction; no acetone, no diacetic acid.

December 4th. Iletin, 14 units once daily, noon. Urine, 15 drops to produce sugar reaction; faint trace acetone and diacetic acid.

December 5th. Iletin, 10 units once daily, noon. Urine, 5 drops to produce sugar reaction; no acetone; faint trace diacetic acid.

December 6th. Iletin, 20 units once daily, noon. Urine, 3 drops to produce sugar reaction; very faint trace acetone; moderate amount diacetic acid.

December 7th. Iletin, 20 units once daily, noon. Urine, 4 drops to produce sugar reaction; trace acetone and diacetic acid. Blood sugar 280 mgs. per 100 c.c. blood.

December 8th. Iletin, 20 units once daily. Urine, 5 drops to produce sugar reaction; acetone trace; diacetic acid trace.

December 9th. Iletin, 20 units daily. Urine, 7 drops to produce sugar reaction; acetone trace; diacetic acid, negative.

tive; diacetic acid, very faint trace. Blood sugar, 230 mgs. per 100 c.c. blood.

December 19th. Iletin, 20 units once daily. Urine, 7 drops to produce sugar reaction; acetone, very faint trace; diacetic acid, very faint trace.

December 20th. Iletin, 20 units daily. Urine, 5 drops to produce sugar reaction; acetone, faint trace; diacetic acid, very faint trace.

December 21st. Iletin, 20 units once daily. Urine, 7 drops to produce sugar reaction; acetone, negative; diacetic acid, negative.

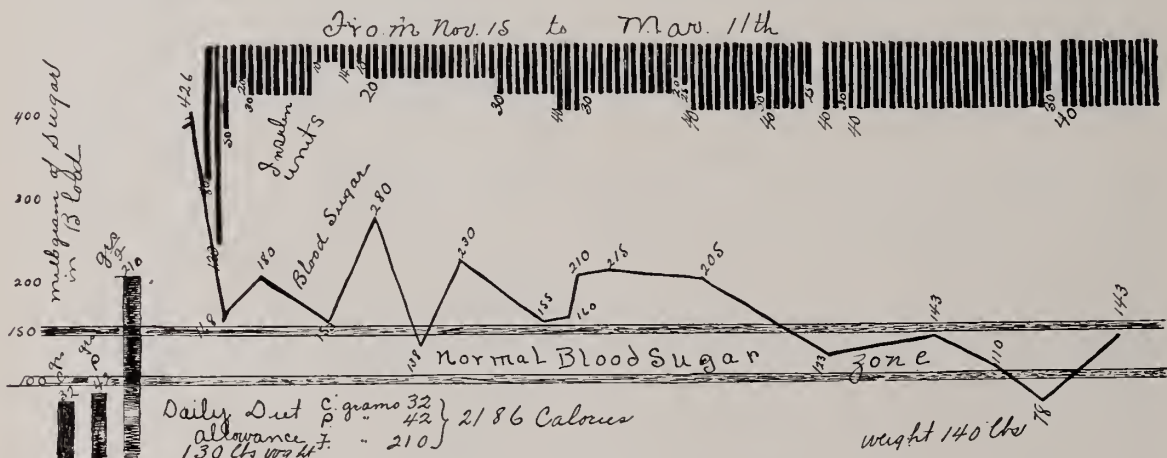
December 22nd. Iletin, 30 units once daily. Urine, 7 drops to produce sugar reaction; acetone, very faint trace; diacetic acid, very faint trace.

December 23rd. Iletin, 30 units once daily. Urine, 2 drops to produce sugar reaction; acetone, negative; diacetic acid, negative.

December 24th. Iletin, 30 units once daily. Urine, 4 drops to produce sugar reaction; acetone, negative; diacetic acid, negative.

December 25th. Iletin, 30 units once daily. Urine, 4 drops to produce reaction; acetone, negative; diacetic acid, negative.

December 26th. Iletin, 30 units daily. Urine, 10



December 10th. Iletin, 20 units daily. Urine, 1 drop to produce sugar reaction; acetone, negative; diacetic acid, negative.

December 11th. Iletin, 20 units once daily. Urine, 8 drops to produce sugar reaction; acetone, negative; diacetic acid, negative.

December 12th. Iletin, 20 units once daily. Urine, 30 drops to produce sugar reaction; acetone, negative; diacetic acid, negative. Blood sugar, 138 mgs. per 100 c.c. blood.

December 13th. Iletin, 20 units once daily. Urine, 7 drops to produce sugar reaction; acetone trace; diacetic acid, negative.

December 14th. Iletin, 20 units once daily. Urine, 3 drops to produce sugar reaction; acetone, very faint trace; diacetic acid, very faint trace.

December 15th. Iletin, 20 units daily. Urine, 9 drops to produce sugar reaction; acetone, very faint trace; diacetic acid, very faint trace.

December 16th. Iletin, 20 units daily. Urine, 3 drops to produce sugar reaction; acetone, negative; diacetic acid, very faint trace.

December 17th. Iletin, 20 units daily. Urine, 3 drops to produce sugar reaction; acetone, negative; diacetic acid, negative.

December 18th. Iletin, 20 units once daily. Urine, 5 drops to produce sugar reaction; acetone, nega-

drops to produce sugar reaction; acetone, negative; diacetic acid, negative.

December 27th. Iletin, 30 units daily. Urine, 10 drops to produce sugar reaction; acetone, faint trace; diacetic acid, negative. Blood sugar, 155 mgs. per 100 c.c. blood.

December 28th. Iletin, 30 units daily. Urine, 25 drops to produce sugar reaction; acetone, negative; diacetic acid, negative.

December 29th. Iletin, 20 units twice, morning and afternoon. Urine, 35 drops to produce sugar reaction; acetone, negative; diacetic acid.

P. M., negative for sugar, acetone and diacetic acid.

December 30th. Iletin, 20 units twice, morning and afternoon. Urine, sugar, acetone and diacetic acid all negative. Blood sugar, 160 mgs. per 100 c.c. blood.

December 31st. Iletin, 20 units twice, morning and afternoon. Urine, 20 drops to produce sugar reaction; acetone, faint trace; diacetic acid, negative. Blood sugar, 210 mgs. per 100 c.c. blood.

January 1st. Iletin, 30 units once. Urine, negative sugar, acetone and diacetic acid.

January 2nd. Iletin, 30 units once daily, noon. Urine negative.

January 3rd. Iletin, 30 units once daily, noon. Urine negative.

January 4th. Iletin, 30 units once daily, noon. Urine (noon), 12 drops, to produce sugar reaction; acetone, heavy reaction; diacetic acid, trace. Blood sugar, 215 mgs. per 100 c.c. blood. Urine (after), negative; sugar, acetone, diacetic acid.

January 5th. Iletin, 30 units once daily, noon. Urine, 10 drops to produce sugar reaction; acetone, negative; diacetic acid, negative.

January 6th. Iletin, 30 units once daily, noon (67316-722843). Urine, 35 drops to produce sugar reaction; acetone, negative; diacetic acid, negative.

January 7th. Iletin, 30 units once daily, noon. Urine, 37 drops to produce sugar reaction; acetone, negative; diacetic acid, negative.

January 8th. 30 units iletin once daily, noon. Urine, no examination made.

January 9th. 30 units iletin once daily, noon (67316-725703). Urine, 9 drops to produce sugar reaction; acetone, trace; diacetic acid, negative.

January 10th. Iletin, 30 units once daily, noon. Urine, 19 drops to produce sugar reaction; acetone trace; diacetic acid, negative.

January 11th. Iletin, 30 units once daily, noon. Urine, 3 drops to produce sugar reaction; acetone, negative; diacetic acid, negative.

January 12th. Iletin, 10 units, A. M., noon, and P. M. Urine, 2 drops to produce sugar reaction; acetone, very faint trace; diacetic acid, negative. (This examination made after second dose).

January 13th. Iletin, 10 units A. M., 15 units noon, 10 units P. M. Urine, 3 drops produced sugar reaction; acetone, very faint trace; diacetic acid, negative.

January 14th. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 7 drops produced sugar reaction; acetone and diacetic acid, negative.

January 15th. Iletin, 10 units A. M., 20 units noon, 10 units P. M. Urine, 4 drops produced sugar reaction; acetone and diacetic acid, negative. Blood sugar, 205 mgs. per 100 c.c. blood.

January 16th. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 2 drops produced sugar reaction; acetone and diacetic acid, negative. Protein, 65 grs.; fats, 210 grs.; carbohydrates, 25 grs.

Urine examinations were made about 5 o'clock P. M.

January 17th. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 2 drops produced sugar reaction; acetone and diacetic acid, negative.

January 18th. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 13 drops produced sugar reaction; acetone and diacetic acid, negative.

January 19th. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 3 drops produced sugar reaction; acetone, faint trace; diacetic acid, negative.

January 20th. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 16 drops produced sugar reaction; acetone and diacetic acid, negative.

January 21st. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 5 drops produced sugar reaction; acetone and diacetic acid, negative.

January 22nd. Iletin, 10 units A. M., 15 units noon, 15 units P. M. Urine, 1 drop produced sugar reaction; acetone, moderate amount; diacetic acid, negative.

January 23rd. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 1 drop produced sugar reaction; acetone, faint trace; diacetic acid, negative.

January 24th. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 1 drop produced sugar reaction; acetone, very faint trace; diacetic acid, negative.

January 25th. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, no examination.

January 26th. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 2 drops produced sugar reaction; acetone, very faint trace; diacetic acid, negative.

January 27th. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 1 drop produced sugar reaction; acetone, very faint trace; diacetic acid, negative.

January 28th. Iletin. Urine, no examination.

January 29th. Iletin, 10 units A. M., 10 units noon, 15 units P. M. Urine, noon, 2 drops produced sugar reaction; acetone, heavy; diacetic acid, negative. Blood sugar, 123 mgs. per 100 c.c. blood.

January 30th. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 1 drop produced sugar reaction; acetone, heavy; diacetic acid, negative.

January 31st. Iletin, 15 units A. M., 15 units noon, 10 units P. M. Urine, 1 drop produced sugar reaction; acetone trace, diacetic acid, negative.

February 1st. Iletin, 15 units A. M., 15 units noon. Urine, 1 drop produced sugar reaction; acetone trace, diacetic acid, negative.

February 2nd. Iletin, 15 units A. M., 25 units noon. Urine, 1 drop produced sugar reaction; acetone, positive; diacetic acid, negative.

February 3rd. Iletin, 20 units A. M., 20 units noon. Urine, no examination.

February 4th. Iletin, 20 units A. M., 20 units noon. Urine, no examination.

February 5th. Iletin, 20 units A. M., 20 units noon. Urine, 1 drop produced sugar reaction; acetone, positive; diacetic acid, negative.

February 6th. Iletin, 20 units A. M., 20 units noon. Urine, 1 drop produced sugar reaction; acetone, trace; diacetic acid, negative.

February 7th. Iletin, 20 units A. M., 20 units noon. Urine, 2 drops produced sugar reaction; acetone, trace; diacetic acid, faint trace.

February 8th. Iletin, 20 units A. M., 20 units P. M. Urine, 1 drop produced sugar reaction; acetone, positive; diacetic acid, negative.

February 9th. Iletin, 20 units A. M., 20 units noon. Urine, 1 drop produced sugar reaction; acetone, heavy; diacetic acid, negative.

February 10th. Iletin, 20 units A. M., 20 units noon. Urine, no examination.

February 11th. Iletin, 20 units A. M., 20 units noon. Urine, fast.

February 12th. Iletin, 20 units A. M., 20 units noon. Urine, 1 drop produced sugar reaction; acetone, positive; diacetic acid, negative. Blood sugar, 140 mgs. per 100 c.c. of blood.

February 13th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

February 14th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

February 15th. Iletin, 30 units A. M., 10 units noon. Urine, 1 drop produced sugar reaction; acetone, positive; diacetic acid, negative.

February 16th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

February 17th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

February 18th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

February 19th. Iletin, 30 units A. M., 10 units noon. Urine, 1 drop produced sugar reaction; acetone, heavy; diacetic acid, negative. Blood sugar, 110 mgs. per 100 c.c. of blood.

February 20th. Iletin, 20 units A. M., 10 units noon. Urine, no examination.

February 21st. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

February 22nd. Iletin, 30 units A. M., 10 units noon. Urine, no examination. Weight, 144 lbs. Diet: Carbohydrates, 47½ grams; proteins, 67½ grams; fats, 150 grams.

February 23rd. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

February 24th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

February 25th. Iletin, 30 units A. M., 10 units noon. Urine, no examination. Diet: Proteins and fats, fast on carbohydrates for 24 hours.

February 26th. Iletin, 30 units A. M. Urine, no examination. Blood sugar, 78 mgs. per 100 c.c. of blood.

February 27th. No Iletin. Urine, 1 drop produced sugar reaction; trace acetone, diacetic acid, very faint trace.

February 28th. Iletin 30 units A. M., 10 units noon. Urine, no examination.

March 1st. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

March 2nd. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

March 3rd. 30 units A. M., 10 units noon. Urine, no examination.

March 4th. Iletin 30 units A. M., 10 units noon. Urine, no examination.

March 5th. Iletin 30 units A. M., 10 units noon. Urine, 1 drop produced sugar reaction; acetone, trace; diacetic acid, negative. Blood sugar, 143 mgs. per 100 c.c. of blood.

March 6th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

March 7th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

March 8th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

March 9th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

March 10th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

March 11th. Iletin, 30 units A. M., 10 units noon. Urine, no examination.

Patient contracted erysipelas of neck, face and scalp and died in eight days.

All through the infection the blood sugar maintained a near maximum normal level and there was no evidence that the patient died from diabetic coma.

1135 West Franklin Street.

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OCULAR COMPLICATIONS OF NASAL SINUS DISEASES.*

By WALTER EYRE LAMBERT, A. B., M. D., F. A. C. S.,
New York, N. Y.

Executive Surgeon of New York Eye and Ear Infirmary.

My excuse for presenting this subject about which so very much has been written since the article of Van der Hoeve, 1911, is that we still have much to learn both as to the diagnosis and treatment of the ocular complications of sinus disease, and that it is a subject of interest to all members of the Society, and not restricted to the ophthalmologist alone. When you think of the close relation of the accessory sinuses to the orbit and the optic nerve, and the frequency of inflammatory disturbances in these sinuses as the result of common colds, *et cetera*, it is really quite remarkable that we do not see more ocular complications.

Young¹ has recently made a report on the study of the relation of the sphenoidal and ethmoidal sinuses to the optic nerve in thirty post mortem specimens. He found that in ninety per cent of these specimens, the bone between the nerve and the sinus was so thin that a horse hair could easily be seen through it. In four specimens, there was actually an hiatus in the bone. Ostia in the bone were commonly found in the lateral wall of the sphenoidal and ethmoidal masses: these led into the sinus giving passage to numerous blood vessels. From these findings, the development of optic neuritis from diseased post-nasal sinuses can be explained. A virulent infection might easily spread through so thin a bone, and in a certain proportion of cases, there are actually hiatuses in the bone that would permit the extension of infection. In addition the numerous blood vessels connecting the orbit with the sinuses constitute a relationship of considerable danger.

The investigations of Onodi have shown that the optic nerve is frequently in close relation to the posterior-ethmoidal cells and the extreme thinness of the intervening walls makes its involvement more likely in disease of the ethmoid, than in disease of the sphenoid. The anatomical peculiarities which occur, as for example a sphenoidal or posterior-ethmoidal sinus of one side being in close contact with the optic nerve of the opposite side, explain the contra-lateral ocular disturbance, as was

*Read at the meeting of the Virginia Society of Oto-Laryngology and Ophthalmology in Richmond, April 18, 1923.

the condition in a case of mine, which shall be reported later.

It is not my purpose to deal with the ordinary and obvious ocular complications of sinus diseases, such as orbital cellulitis, but with the affections of the deeper structures, such as uveitis, choroiditis, optic neuritis, especially retrobulbar neuritis. We know all of these conditions may be due to some cause other than sinusitis, especially in the sphenoid and posterior ethmoid.

Uveitis, resulting from disease of the sinuses is, I think of more frequent occurrence than we realize, but the etiology of some cases of uveitis is very obscure. Peter² reports a case of uveitis occurring in recurrent attacks, alternating between the two eyes. X-ray examinations showed a clouding of the right sphenoid and the posterior ethmoid areas. Careful rhinological examination by two specialists showed no evidence of sinus involvement even after turbinectomy. Later, however, evidence of sinus disease was found by a third rhinologist. Operation confirmed the diagnosis. The author is of the opinion that a careful study of the posterior sinuses should be made in every case of uveitis of obscure origin.

Affections of the optic nerve are those in which we are particularly interested, and the diagnosis in such cases, especially an early diagnosis, is of the utmost importance. While it is very easy for the ophthalmologist to diagnose a papillitis, a papilloedema, or a retrobulbar neuritis, it is extremely difficult to be sure of the cause, but we do know that acute or chronic sinusitis does produce these conditions and, having eliminated the other causes, it is our duty to promptly enlist the co-operation of a rhinologist.

In 1911, Van der Hoeve³ published several cases illustrating the importance of enlargement of the blind spot, as an early sign of optic neuritis due to posterior nasal sinus disease. In some of the cases, central scotoma appeared soon after, but in others the enlargement of the blind spot was the only defect in the visual field observed for some time. In his 1922 article⁴, he again refers to enlargement of the blind spot and central scotoma as characteristics of optic neuritis due to sinus disease, but notes that these same symptoms may also be present in optic neuritis due to other causes. He concludes, therefore, that the ophthalmologist has in the eye no sign at

all to distinguish the origin of a retrobulbar neuritis.

He thinks the X-ray is of great value in the diagnosis of sinus disease without definite clinical symptoms, especially if the sinuses be photographed in different directions. For a study of the sphenoidal sinus, Van der Hoeve uses the bi-temporal and occipito-caudal method according to Pfeiffer, and for the ethmoidal sinus, the Rhese method, with the patient lying face downward and the tube over the protuberantia occipitalia. Yet even with the best technique, there are cases in which the roentgen examination is negative. Therefore, "the rhinologist cannot say with absolute certainty that a person has no sinus affection." This opens the question as to whether in optic neuritis of unknown origin, the nasal sinuses should be opened. Van der Hoeve believes that this must be determined in each case by consultation between the ophthalmologist and the rhinologist. He does not wish to express the dogmatic opinion that the operation should be performed in these cases. In favor of this operation he notes, however, that in some cases the opening of the sinus, even when nothing definitely pathological has been found, has resulted in permanent or temporary improvement in the optic nerve condition.

He reports a case with retrobulbar neuritis and choroiditis with marked enlargement of the blind spot for colors in a man who had undergone several operations for sinus disease. The roentgen ray in this case showed the ethmoid region clear except for a rectangular spot close to the optic foramen; at operation, purulent secretion was found in some of the ethmoid cells at this point, and after the opening and draining, the visual symptoms were completely relieved.

Vail⁵ (1919) reports three cases of optic neuritis due to hyperplasia of the ethmoid bone. The characteristic eye findings in these cases, he notes, are monocular blindness, sluggish response of pupil to direct test and dull pain on deep pressure, the latter not always present. Where vision is present, it is eccentric with a large central scotoma. If the case is seen earlier, there is a central scotoma for colors and enlargement of the blind spot.

There is often no definite pathological lesion in the nose. In some cases in which the middle turbinate is normal, it is shrunken with cocaine

and adrenalin, and evidence of hyperplasia of the ethmoid may be obtained by observing small polypi hidden beneath it. The most frequent clinical symptoms of ethmoid hyperplasia, Vail notes, are sneezing followed by a watery discharge, transitory impairment of nasal respiration, especially at night, frequent head colds. There is no pain and no purulent discharge and the symptoms noted are slight and cause the patient no great discomfort. In some cases even these slight symptoms are not present.

Bordley⁶ in 1920 reported eleven cases of optic neuritis due to posterior nasal sinus disease, of which four showed scotomas of sufficient dimensions to extend beyond the blind spot. These scotomas were absolute when patients were first seen. In the other seven cases, the condition varied from a loss of perception for red to absolute scotoma. All were progressive up to the time of the nasal operation. In eight cases, the scotoma disappeared entirely from twenty-four to thirty-six hours after the operation. The most prompt response was observed in patients with the greatest changes, in whom these changes developed with the greatest rapidity. Bordley believes that where a careful examination has excluded all other causes of an optic nerve lesion and the visual disturbances are progressive, an operative exploration of the ethmoidal and sphenoidal cells is justified.

In a later article, 1921, Bordley⁷ states that in involvement of the optic nerve from sinus disease the most common alteration is an enlargement of the blind spot, which is of spindle form gradually overspreading a preceding and advancing scotoma for color. In one hundred and two patients with sinus disease, he found this as symptom thirty-one times. Other central and paracentral scotomata are of less frequent occurrence, but more important from a visual standpoint. The central change varies from a mere disturbance in red and green perception to a positive scotoma for colors and white. In sinus disease this alteration is usually unilateral and more rapid and definite than in optic neuritis due to other causes. There are, however, exceptions to this rule. In the diagnosis of sinus disease, Bordley says intra-nasal examination is often entirely negative. The roentgen ray is in his opinion the best method of diagnosis, but only if several radiographs are made from different positions

by an experienced radiographer, well acquainted with anatomic variations in the size and position of the sinus. A single negative radiograph is of no value in excluding sinus disease.

Crane⁸ in 1921 reports three cases of optic neuritis due to posterior sinus disease. In two of these cases, there was a history of influenza and some nasal trouble since the acute attack. In only one of the cases was pus observed on post-nasal examination. In all, the septum was deviated and the middle turbinate enlarged. Operation in the two cases, in which patients were seen during the early stage of the optic neuritis, restored the vision completely. In the third case, there was no active sinus infection; the ethmoidal cells showed proliferation and the sphenoidal sinus contained mucopurulent fluid with some polypoid degeneration of the mucous membrane.

From the study of over thirty cases of optic neuritis, associated with disease of the posterior and nasal sinuses, White⁹ has come to the conclusion that abnormalities in the size and position of the middle and superior turbinates is an important factor in the etiology of this condition and, in the diagnosis of these cases, special importance should be attached to any abnormalities of the turbinates. A deflection of the nasal septum is also frequent in these cases. Suppuration of the sinuses that can be definitely diagnosed by the rhinologist is comparatively rare. The roentgenograms are often negative, because the infection is so frequently exudative and non-suppurative. With more careful technique and a more careful timing of the plates, a slight cloudiness has been shown in some cases and the author hopes that absolutely negative reports may not be so frequent in the future. In the ophthalmological examination, White states that a central scotoma with ability to see sideways persisting for some time suggests an optic neuritis of nasal sinus origin. A careful neurological examination should be made to rule out brain tumors, and multiple sclerosis, and a general examination to rule out other infections and toxic conditions that might cause the optic nerve lesion. If all other causes can be definitely ruled out, White believes a semi-radical sphenoid operation is justified, even if no nasal pathology can be demonstrated. A complete ethmoid exenteration is not necessary in his

opinion unless indicated by definite pathological conditions in the ethmoid labyrinth.

White has found that involvement of the optic nerve in posterior nasal sinus disease may be due to direct extension of the infection, toxemia originating in the accessory sinus lesion; infection by way of the blood stream from focus in the sinus; and, finally, to extension by hyperplasia, probably more important as a predisposing factor in other conditions than as a cause *per se*.

Stark¹⁰ (1921) says that in the ophthalmological diagnosis, where the visual symptoms are not of too sudden onset, central scotoma for color and enlargement of the blind spot are the two signs most characteristic of optic neuritis due to sinus disease. Exophthalmos may also be observed in these cases. From the nasal standpoint, the common symptoms of sinus infection are not usually present. A deflected septum or middle turbinate pressed against the lateral wall are more frequently observed. Both transillumination and roentgenography should be used in diagnosis, although the roentgen ray findings are frequently negative. A careful general examination must be made to exclude other causes of optic neuritis.

Gallaher¹¹ (1921) reports four cases with blurring vision and intermittent blindness; central scotoma was present in two cases; central scotoma for colors in one case; and in one case it was not reported by the oculist. In three cases, deflection of the nasal septum was found. This was corrected and the ethmoids and sphenoid opened. In the fourth case, the nasal operation was done without definite diagnosis of nasal abnormality. In all cases, improvement followed operation. In two cases, restoration of normal vision was complete. He says that in making an ophthalmological diagnosis, the two most important points to consider are the condition of the blind spot and central scotoma for colors.

In making a rhinological diagnosis, too much importance must not be attributed to the fact that no pus is present. Any nasal defect or systemic disease which produces nasal inflammation should be considered as possible etiological factors in retrobulbar neuritis due to ethmoidal-sphenoidal disease. In cases where no pathological condition can be demonstrated in the nose, it is entirely justifiable to open the posterior ethmoids and sphenoid, rather than jeopardize the patient's vision. If sup-

puration is present in the ethmoidal-sphenoidal cells, the optic nerve may become involved by direct extension of the infection, or by toxins. In cases, with low grade inflammation, the inflammation and hyperplasia may extend to the neighboring parts, involve the orbit, and cause pressure on the optic nerve, especially by the swelling of the periosteum of the optic foramen.

Sluder¹² reports no cases in his article, but states that optic neuritis in his experience is "not uncommonly secondary to post-ethmoidal and sphenoidal diseases." It has a good prognosis if the nasal lesion is operated on early—i. e., within three months and if performed "comprehensively."

In diagnosis of these cases, other possible causes of the optic nerve lesion should be constantly kept in mind and carefully eliminated; if the lesion is accompanied by several dioptres swelling, it is difficult, if not impossible, to differentiate it from a lesion due to intracranial pressure. The nasal diagnosis in these cases is not always easy; optic neuritis is not necessarily secondary to suppuration of the para-nasal cells. In the rhinological examination, special attention must be paid to the slightest changes in the appearance of the mucous membrane of the post-ethmoidal-sphenoidal region.

Cutler¹³ notes that in involvement of the optic nerve due to posterior sinus disease, the enlargement of the blind spot in the early stages may be so slight as hardly to attract the attention of the patient. Yet, if neglected, permanent injury to the nerve and blindness may result. The author regards this so-called Van der Hoeve sign as of more importance in diagnosis than ophthalmoscopic examination. This sign may be considered positive when the scotoma for colors is considerably larger than for white, when the extent of the scotoma for white and colors is decidedly greater than normal, when the size of the scotoma is greater in one eye than in the other, when the size of the scotoma changes during the course of the disease.

Among the symptoms suggestive of sinus origin of optic neuritis, Cutler notes orbital tenderness, fleeting oedema of the upper lid, slight ptosis, insufficiency of accommodation, pain on pressure of the eye backward. He cites one case in which the patient, on awakening, noticed blurring of the vision, left eye.

Examination showed a large ill-defined scotoma extending over the region of the blind spot to the fixation point with small absolute scotomas above and below, the extent of the scotomas varying daily. Rhinological examination was negative, but a radiograph taken at an usual angle from below showed faint clouding of the posterior ethmoid cells. The posterior sinuses were opened and irrigated; although no pus was found, the visual condition cleared up absolutely after the operation. The X-ray, Cutler believes, is usually inconclusive, but may give corroborative evidence. Even though the vision is seriously impaired in cases of optic neuritis of sinus origin, recovery may be prompt and complete after operation with adequate draining of the sinuses, if the neuritis is not of too long standing. In the more chronic cases where the nerve has been organically impaired, improvement is less marked.

Redding¹⁴ reports eight cases of optic neuritis due to sinus disease in which the visual disturbances ranged from slight enlargement of the blind spot to complete blindness in one eye. Two of the patients had had an attack of influenza, and one complained of frequent "colds in the head." Two patients had more or less constant headaches of the deep orbital type. Seven of the eight cases were X-rayed and all were negative. All of the eight cases were sent to a rhinologist for operation and, in all, either pus or a thickening of the mucous membrane was found in the posterior ethmoid or sphenoid, or in both sinuses. In all these cases, there was some improvement in the vision, and in the cases where the visual disturbance was comparatively slight and of short duration, the vision became normal.

The author concludes that in cases of optic neuritis, in which all other causes can definitely be ruled out, even though the nasal condition is apparently normal, and the X-ray negative, "the diagnostic limit has not been reached until exploratory puncture of the posterior ethmoid and sphenoid sinuses has been made." The X-ray should be used routinely in every case but a negative finding does not prove the absence of diseased sinuses.

Hajek¹⁵ reports twelve cases in which no definite relationship between the posterior sinuses and the optic nerve lesion could be determined, although they were of the type usually considered to be of the posterior sinus

origin. In three of the cases, there was enlargement of the middle turbinate; in these cases, some improvement followed the nasal operation, but in two of the three, there was a recurrence of the visual symptoms. He concludes that unless there is a definite demonstrable pathological condition in the nose and sinuses, the nasal origin of optic neuritis is very questionable.

Maller¹⁶ does not agree with this opinion of Hajek. He believes that the ophthalmological findings, rather than the rhinological, must determine the necessity for operation on the nasal sinuses.

King¹⁷ reports a case with very remarkable restoration of vision after operation on sinuses. One eye was totally blind when the patient was first seen, but the fundus was apparently normal. The other eye was normal. X-ray showed the right ethmoid and both antrums cloudy. A simple exenteration of the anterior and posterior ethmoid was done and the anterior inferior wall of the sphenoid removed. Five days after operation, the patient counted fingers at two and a half feet, and within two weeks vision was improved to 20/40. A Wassermann test made then was found to be four plus. Anti-syphilitic treatment was immediately given. Ten days after the operation on the first eye, vision of the left began to fail and within a few days was practically nil. In view of the four plus Wassermann, the operation on left side was deferred. As no improvement took place at the end of another week, operation on the left side was made with the result of an improvement of vision to 20/40.

Dr. Northcott reports a case where headache was the only symptom, both eyes normal. Some time later, patient returned complaining that one eye was tender under pressure and felt lame. Vision and fundus were still normal. About a week later, vision was reduced to 15/50 with a central scotoma, and a large blind spot, and definite papilloedema. Next day vision was only 15/100. X-ray of sinuses and sella was negative. Under nasal shrinking, vision was increased to 15/50. The posterior ethmoid sinuses were then opened by rhinologist with the result of an uninterrupted recovery with complete restoration of vision.

The following case with a very tragic termination, reported by me at a meeting of the American Ophthalmological Society in 1918, is a striking example of the importance of

prompt and active surgical interference, where X-ray and clinical evidence of any sinus disease are negative. As Sir James McKenzie said, "let us not be exclusively laboratory physicians."

The patient had been under my care since 1896, when she consulted me for severe headaches, which she referred to her eyes. She was using the proper correction for her error of refraction, but I found she had a small amount of hyperphoria. I did not regard this of great importance but did prescribe a prism of three degrees, which apparently gave immediate relief. That the hyperphoria was the cause of her eye strain was proven subsequently by an error in making the glasses, prism being misplaced. All the symptoms returned with use of new glasses and, when properly made, she had immediate relief, and continued to have perfect comfort with eyes for many years. In March, 1917, Mrs. S. consulted me again. For some time previous to this visit, she had been in very poor health and had been under the care of several physicians in Boston. I found no change in her eye condition and referred her to a physician in New York with the suggestion that she had some sinus trouble. X-ray showed a "root fragment pushed into the right antrum. The antrum also showed distinct occlusion of its air space, which possibly may have been caused by the displaced root fragment. The rest of the sinuses appeared quite normal. There was considerable constriction in the nares, caused by the deviated septum and enlarged turbinates. The sella was smaller than the average. There was no evidence of any infection about the teeth."

The antrum, when operated on April 6, 1917, was found to contain considerable amount of green pus. Permanent draining was established through the nasal cavity. A bacteriological report of cultures from the antrum showed streptococcus viridans. Blood culture was negative. Headaches were relieved and apparently an uninterrupted recovery was made, although a slight septic temperature occurred occasionally. On May 7, 1917, she complained of blurring vision of the left eye. Headaches returned and the patient was running a temperature of from 100 to 101. When seen May 8th, pupil was moderately dilated, no reaction to light, and not even light perception. An ophthalmological examination showed a marked though moderate papillitis, arteries

small and a sluggish segmented circulation in the veins. Right eye was unaffected, vision being perfectly normal.

Dr. Weeks saw the patient with me and we thought there was a partial occlusion of the central artery, probably a thrombosis of septic origin. Two days later, the right eye became affected and a similar ophthalmic picture presented itself, vision being reduced to fingers. A definite diagnosis of retrobulbar neuritis was then made and an immediate operation advised, but operation was deferred until next day when an X-ray was made and found negative. Two days later vision right eye had slightly improved and we were able to demonstrate a distinct central scotoma for form and color, tenderness on pressure on the globe, and pain on movement of the eyeball. Operation was then again considered but, after consultation with two well known rhinologists, it was regarded as futile. Vision of the right eye failed rapidly and, in about three days, the patient was totally blind, atrophy of both optic nerves supervening.

There was no question in my mind that we were dealing with an acute retrobulbar neuritis of septic origin, the disease having extended from the antrum to the posterior ethmoidal cells and the sphenoid. The fact that the left eye was the first to become affected, whereas it was the right antrum that was diseased, is not uncommon. This contra-lateral visual disturbance in nasal sinus disease has been frequently observed by Onodi. As the process was so acute and so intense, it was of course extremely doubtful if an operation would have relieved the condition, but I think it should have been performed.

I might continue indefinitely relating cases where remarkable results have been obtained by treatment of, or operation upon, the adjacent sinuses. The great question to be considered, however, is when are we to decide upon operative interference, and what are some of the early diagnostic symptoms of ocular complications originating in the accessory sinuses? From the authors quoted, we must conclude that the enlargement of the blind spot is very important evidence, and the careful mapping out of this should be done not once but frequently. If the other obvious causes of optic nerve disturbances can be eliminated, even though the clinical and X-ray evidence of diseased sinuses be wanting, an operation

upon the posterior ethmoidal and sphenoidal cells is justifiable.

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PSYCHOLOGY IN MEDICINE.*

By GREGORY STRAGNELL, M. D., New York, N. Y.

I have decided to give an informal talk on certain phases of the interrelationship existing between psychology and medicine. There are among psychopathologists two groups, in two camps more or less. On one side are workers like Cotton, who attribute practically all mental or psychological disturbances to organic factors and try to remedy them by removing what they consider the underlying condition. The physicians in this group usually have their favorite scapegoats. One attributes all evil to teeth, another to tonsils, still others are very fond of blaming the colon. This is no doubt a hangover of homeopathic medical magic. The other group more logically finds that psychological disturbances have a definite psychological origin. And some of us who handle these cases sometimes come to a point where we are confused and want to know what really is the difficulty. During the few years in which I have worked on the problem, I confess that I have reached no complete explanation. The few ideas that I shall present appeal to me from both the theoretical and the practical point of view. In order to present the situation as I see it, I am going to cite a few cases.

The first one is of a girl who came to me, not for a mental or neurotic disturbance, but for a hyperthyroid condition. On examining her, I found that she presented all the earmarks of what one would expect of a hyperthyroid condition, not only symptoms but markings—practically no hair on the outer part of the eye-brow, typical bluish, regular, pearl-like teeth, very fine hair, skin a translucent pink. There had been loss in weight; pulse from 160 to where it could not be counted. From the little anatomical markings we may conclude that I was dealing with a definite underlying organic condition. There was something wrong primarily with the thyroid mechanism. I am stressing that because it is what makes the difference in this case. She came to me; I examined her, went over her case and did nothing in the way of medication. I did not even give her any psychological treatment. I listened to her story and that was all. She kept coming once or twice a week, and within two weeks the pulse was down to about ninety. She had begun to take on

weight and the entire picture had changed. There had been no surgery and no medicine. What had happened? Going into details, she had been going along working in a dressmaker's establishment. She had accumulated a few additional worries, mother's health, the problem of whether she still loved her lover or whether he still loved her; not one big exciting trouble; just an accumulation of little things heaped on top of the responsibility of facing the realities of life which she was doing so bravely. The mere fact that she was able to relieve her mind by talking to me, going over the situation with someone, and feeling that she had someone to lean on, enabled her to release the tension which had brought about the activation of the faulty thyroid mechanism. Here is an interesting point: Supposing I had used some psychological method on her? Then there would be a question as to whether the treatment had cured her. Supposing she had been treated by a surgeon or by internal medication? A doubt comes to my mind. If any of these methods had lessened the thyroid activity, reduced the pulse rate, etc., would she have been cured? Perhaps.

What I want to show is that there was an underlying organic condition which had been activated by an added psychological load and the overloading increased the metabolic rate to more than she was able to handle. By releasing the tension caused by the surplus load by her talks with me, she was able to make a temporary adjustment. After this temporary adjustment was made, if it could be carried over to a permanent condition and she could have understood her condition from a psychological point of view, then she would have reached a state of well-being with the exception of the primary faulty thyroid condition which she would have been able to handle on a compromise. Whether this would have been the ideal situation I do not know. Perhaps it would have been best to have brought her to a mental cure and then employed some form of medical treatment.

Another case is that of a man who was referred to me by a physician. His complaint was impotence. He was forty years of age, very intelligent. He had been to a number of genito-urinary men who found nothing organically wrong. They did not seem to think that his disability mattered but he seemed to think that it did. He came to me in despair. With the impotence he had a marked depres-

sion. Which was the primary condition, I am not sure. I went into the history and found a strange picture. I found that (he was a widower) he had been having promiscuous relations with the wife of a friend and, just before this impotence, there came an episode which made discovery likely and following this the impotence appeared. This I considered a purely psychological effect. I went into the history at great length. The condition did not clear up at first. Potency did not return. When I questioned him more minutely we got back to some very early childhood impressions. An important episode which had left a lasting impression was that when a boy he had seen his parents in the sexual act and this memory affected the present situation. He now had a feeling of fear that he would be caught in the act. In the childhood picture there was a triangle consisting of the parents and himself and in the second triangle he was taking the father's place in the sexual act and he was fearful that someone would replace him in the role of onlooker. There were countless other details which were revealed from a study of early childhood patterns, his dream life, his likes and dislikes. . . . The Oedipus triangle was portrayed in all its details. The result in this case was that the man was cured and he established his sexual life on a new licit basis. We have a picture of an apparently organic affection which is completely removed by searching out the underlying psychological cause of the situation.

This man, by the way, presented another interesting point. All his life he had been doing what so many try; that is to prove his potency to the world in one way or another. This is interesting because it is so frequent. A great many apparently love relations which are not based on love in any sense of the word, are merely an attempt to prove potency, continually trying to add conquests merely for the sake of reassurance. In this case the patient had a feeling of relative impotency on account of the pattern which his early childhood experiences had established. He then tried to have as many conquests as he could in order to compensate for his unconscious feeling of inferiority. You can see this everywhere--vicarious attempts to prove potency.

To revert to endocrinology, not from a strictly endocrinological point of view but merely from the viewpoint of the little ear marks that we take advantage of in diagnosing

diseases and trying to determine whether they are either organic or psychological: A little girl of seven was brought to me because of difficulty in school, and this difficulty had been brought about by her sexual development. Her condition might be called *pubertas precox*. She was sexually developed to the point of maturity. She had first menstruated at the age of three. Her breasts were fully developed and her hips were those of a mature woman. There was well marked pubic hair. Mentally she was a child of seven, there had been no change. She was a nice sweet little girl. Her sexual development began after an attack of diphtheria which no doubt had caused a stimulation of her gonads. What the pathology was I don't know. I would be interested to follow it up and to examine its ramifications. I tried to get as much as possible of the family history in the various branches and I found the following:

She was an only child. An aunt of hers who had been married eight or nine years was sterile and anxious to have children. A sister of this aunt had never menstruated at all. I found a third aunt in another branch of the family whose menstruation was irregular. Now we have recently been working on the theory that the lateral incisor teeth have a close connection with the development of the gonads in both male and female. It is not thoroughly worked out but there is evidence to show a close relationship. An interesting point was that in each of the cases the lateral incisor teeth were missing in the women. In the little girl they were present. I went into the history further to see what this deficiency was which was manifest as a strain through the family and by anatomical landmarks. What had happened; what psychological effect had it had? What were these women doing to compensate for a defect which they undoubtedly realized unconsciously? I found an extremely neurotic group of women. The woman who had irregular menstruation had a feeling of tremendous inferiority. She was shy and would blush on the slightest provocation. She did what I have seen few women do, stutter. She was afraid of men, did not like to meet them. In every way she ostracized herself and made her life a torture. The woman who did not menstruate at all presented a similar picture; hated men and avoided them. She had no frank erotic relationship with women but very close friendships. The third was the woman who

menstruated but had no children and this was the most interesting of all. She, in her desire to have children, tried all sorts of what might be called illicit experiments. There was no question of morals, merely her frenzy to fulfil her biological role. Her effort to secure children at any cost resulted rather disastrously finally. She contracted syphilis; it became known to her husband and there was a separation.

The ramifications of the underlying psychological defect with the effort at compensation resulted in a defect both organic and psychological. In the little girl the gonadal segment had been attacked by diphtheria and the gonadal tissue broke down, resulting in the menstrual cycle being pushed ahead. In the other female members of the family we see psychological attempts at compensation. In those cases an understanding of the organic and psychological factors would have avoided a great many of the disturbances which had occurred.

Of course you are all familiar with the toxic psychosis of pregnancy. We have a woman going along making her ordinary adjustment in her life and she becomes pregnant. She may go on to lactation and finally present a psychological disturbance. What is this underlying psychological disturbance? There is apparently no added difficulty psychologically; no added psychological load during the pregnancy. But in the pregnancy there is an added physical load which lowers the resistance and the buried conflicts come to the surface. Of course this may be so in any physical illness. The extra load may be psychological or physiological. Careful investigation is necessary. The origin of the mental disturbance that the woman is having is not on the surface; it is down deep. We find a woman who has had one or two children and should be happy having fulfilled her biological role. There are no financial difficulties. Apparently the marital situation is satisfactory. The break may take any form; the woman may be depressed. It makes no difference what form is encountered. There may be flighty thinking for a few hours or a chronic condition lasting several years. The underlying mechanism is the same. We find invariably in those cases that there have been conflicts in that person's life which have never been settled. We all have them. We settle them on a basis of compromise habitually when we are active. These conflicts along

with household duties and added strain of pregnancy make adjustment from day to day more difficult. What is the nature of these conflicts and how can we discover them? Frequently they go back to early childhood. Perhaps they may appear foolish but not to the persons affected.

One case was of an intelligent woman, third baby, and on investigation I went back into her early life and found there had always been a feeling of great inferiority. She made her adjustments at a tremendous effort. All this went back to an early episode of childhood. I don't say that this caused it but I do say that it served as a nucleus. When she was a little girl she was going down the street to school and saw a man expose his genitals. She did not think much about it and went over to play with some other little children. She told them about seeing the man. She did not tell her parents. The next day the mother of the children called her aside and said: "You have been a very naughty girl and are not to play with the children any more." She felt mortified. She told no one. This had a great deal to do with her taking up the profession of nursing later; her desire to find out about these things for herself; the impulse to peep had been emphasized by the exhibition she had witnessed. Her whole life was distorted by this and one or two similar things. The incidents had been buried and never settled. She was able to make adjustments from day to day, hour to hour, but with the added load of pregnancy she broke down.

We frequently have great difficulty in placing our finger on the underlying condition and for that reason have to take advantage of a great many little clues as it were.

In relation to this I recall the case of a boy of fifteen, suffering from dementia praecox complicated by many compulsions. He would pick up every piece of paper he found and write in German "Four sisters, four sisters, four sisters," all over the paper. He covered every piece of paper he found with these words. He had been in the hospital four months and he was finally turned over to me for examination. I found that that little symptom was the root of all his difficulties. It went back to an incest situation. His mother had been pregnant and he was very jealous of the father. His mother was still his ideal and his deeply rooted sexual object. He resented her being pregnant. There were sisters enough.

These two words "four sisters," remained the symbol to him of the situation. He had four sisters already and did not think his mother should have another child. He was extremely jealous. He had a low order of mentality. He thought he had discovered a new secret in masturbation. He wanted to tell his father of his great discovery. The real reason for this was that if his father masturbated he would not have sexual relations with the boy's mother. He wanted the mother for himself. The nature of the situation was explained to him and he made a fair adjustment being able to secure employment as a laborer. It shows that we have got to trace out as far as possible the little things.

Then there are cases of postural tensions. Postural tensions include the way a man sits, shakes hands, walks, smiles and countless other everyday activities. Many pathological conditions may be revealed by a careful observation of these and many other little traits. They may take extreme forms where a patient will attempt to remove an offending segment from which he fears the gratification of some tabooed desire, as in the case of a male homosexual who attempted to cut away his rectum with a pair of nail scissors. Another tried to perform a symbolic castration by tearing out his eyeball. Numerous examples are shown in Kempf's book on *Psychopathology*. Many suicidal efforts reveal this effort of removal of a troublesome area or segment. I had a patient under my care whom I saw in consultation with Dr. L. Pierce Clark, who clearly showed this mechanism in repeated suicidal attempts such as cutting his wrist and neck with the blade of a safety razor. There are countless degrees. We must observe the little things. A patient may rub his lips, stroke his ear, scratch his nose. We should search to find the meanings of these unconscious acts.

A study of endocrinology frequently gives us a suggestion as to the earmarks of various endocrinologic imbalances. Pituitary types show some most interesting cases. I recall the case of a boy who wanted to create perpetual motion. He came to me with a marked depression. Toxic absorption was present from some abscessed teeth. He immediately got better after they were removed. The depression was removed but his underlying psychological disturbance remained. Now we know that the pituitary has to do with the sense of time. It also in some way has to do with orderliness

and rhythm. It has a tendency to have a great deal to do with a man's occupation. If the pituitary is disturbed in women, an irregular menstrual flow results. This boy's interest in machinery was undoubtedly influenced by his pituitary and, as we went into the case in question, it was found that the manifestation was also a symbolic compensation for sexual impotence. He was trying to create perpetual motion as compensation for his inability to reproduce. It was a complicated mechanism. When he told me of the perpetual motion I immediately suspected a pituitary disturbance which was a compensation for an initial gonadal deficiency. What happened? He was shown the underlying cause and has become very successful in inventing practical things.

Another case will show how a pituitary mechanism was brought into play. A man was brought into the hospital with a chancre over his right eye. He was a truck driver on a brewery wagon, had had no education whatever and was extremely illiterate. He was given mercury and iodides. He had a virulent infection on account of the brain tissue being directly attacked by the syphilitic virus. Strange to say, as he was convalescing he asked for paper and pencil and made a most marvelous architectural design. It was shown to architects and they were astonished. I don't know what the whole story is but I do know that the pituitary was activated. He also began to play wonderfully on the flute. He was taken to an opera and on his return played the entire score on his flute. The music and drawing were both pituitary manifestations.

I could give more instances. If I have jumbled the situation, so much the better for then I have presented the situation as it really is. There are many workers in this field; most of them tell us that they know all about it, just what percentage of mental disturbance are organic, psychological, endocrinological. And I will have to see certain cases they have diagnosed and I will know all the time that the men who have made the diagnoses are enthusiastic but don't know what they are talking about. My colleagues will show me other cases like the thyroid one I mentioned and will say that they have cured the patient. They will get to fighting about the situation bitterly, sincerely. I am of the opinion that in this case the condition was both organic and psychological. My feeling in the matter

is that the less you try definitely to settle matters the better. The more you try to investigate and add to what knowledge you have without trying to make it prove a conclusive picture, the wiser you are. If we knew all there was to know there would be no chance for some to say this and some that. The most we can do is to say this little part of evidence seems to fit and we are trying to work the thing out.

I believe the people who are putting all the stress on the organic are doing it because they are unwilling to probe into the psychological side. And those on the other side are over-enthusiastic over a new toy.

There is just one other case. A woman with gastric ulcer had been to the Johns Hopkins Hospital. She had had many types of treatment. She came to me because she was afraid of snakes or something of that sort. Her gastric ulcer disappeared shortly after she came to see me and I am absolutely sure that in this particular case the gastric ulcer was due to the tension of a purely psychological situation. But every gastric ulcer does not happen this way. I know this one did. However, every case of gastric ulcer can be benefited by probing into the psychological background, whether the condition is organic or functional.

There are many things to understand. We must take into consideration even the things the patients themselves are not aware of to which they attach no significance. Even dreams are important in these instances if we are familiar with the technic of interpretation. Everything must be taken into consideration if you are going to discover the psychological phases of our difficulty.

DISCUSSION.

DR. WALTER COX, Winchester: In this connection I want to present a case history and remedy. About our only effort is to remedy the evident organic condition but I think this paper is illuminating in showing that these cases have no discoverable organic basis and therefore it behooves us to take measures along his line. Most of us have little experience or ability along this line. In one case, a young woman, thirty-five, school teacher, had been practically disabled for about twenty years by a curious, very frequent nocturia. She was worn out by losing sleep at night. It had a very interesting outcome. Every attempt was made to find an organic cause. Resorted to all kinds of specialists. It turned out to be a trauma at the age of fourteen. While riding a bicycle, she ran into a car loaded with bricks. This was followed by very profuse first menstruation and neurasthenia. An attempt was made to remedy the condition by trying palliative organic methods. Tried stretching the urethra and did her harm. She was very bright and had some knowledge of the subcon-

scious. I told her that I was going to talk to her a little while and if she believed what I said I would promise her cure. That was going pretty strong, but I did it. I explained the mechanism of micturition and showed her that during consciousness during the day she had no trouble. At night the subconscious impression of helpless injury caused trouble. She has had no trouble since then. The result was a very striking example of conditions brought to our attention so ably by Dr. Stragnell.

DR. J. H. DEYERLE, Harrisonburg: I have had several patients who ceased menstruating during the menstrual period. One followed typhoid fever, the other was, we think, probably a tuberculous condition. I would like to have Dr. Stragnell's opinion about it.

DR. STRAGNELL: In regard to the last question, first I don't see why it should not be reasonable to assume that it was not a purely organic thing, always with the reservation that there may be a psychological element back of it. We know that in tuberculosis very frequently there is a shutting down of the menstrual flow. The forces of resistance are trying to overcome the ravages of disease, and conserving energy wherever possible. There is also a complicated calcium metabolism going on in tuberculosis, typhoid fever and menstruation of which we know little. We do have cases, however, where menstruation is suppressed solely through unconscious mechanisms. I have seen cases of pseudopregnancy caused by these same factors. I can recall several cases where examinations were made and where the fetal heart sounds were supposed to be heard and and there was merely psychological pregnancy.

It is interesting to see the role that intercurrent infections play on growth and metabolism. I saw a girl about a year ago who was having the second dentition and while the teeth were emerging she had influenza and the laying on of the enamel was arrested, showing an upset calcium metabolism with injury to the delicate cells. That is also interesting if followed on through the work done by Mott, Such and others regarding the postmortem examination of gonadal cells in dementia precox. During the period of adolescence or embryonal growth, the cells are subject to a sort of trauma. We know that the object of all our lives is to continue to reproduce. In those who do not care to live, the first impulse is to destroy life. This is easily effected through an unconscious self-destruction of the gonads at puberty.

As to the question of nocturnal enuresis, it is interesting to me not only as the case was told but because of some of the more remote psychogenic factors involved. One or two cases similar to this one have come under my observation.

A boy twenty-one years old came to me, not for that trouble, but with dysphagia. He came first of all on account of not being able to swallow any food excepting milk. He said that if he swallowed he choked. Of this he was afraid. Incidentally I found that he would go home Saturday at noon and stay in bed until Monday morning. He had milk every three or four hours during this time. He had to get up to urinate every hour or so. It was an interesting picture. The boy in that particular case was trying to get back to an infantile state unconsciously, having his mother bring him milk every few hours, etc. He was urinating frequently just as when a baby. It was a reduplication of the infantile picture. He had just got out of school and had to make his living. Consciously he was willing to work but his unconscious impulse was to be a baby again. After the explanation of the condition the boy's symptoms cleared up. He understood the mechanism

of the unconscious impulses and was perfectly able and willing to assume his responsibilities and now leads an adult life without going back to his infantile week-end parties.

Two more cases: One of a young man, very successful, came to a colleague of mine on account of a compulsion of going to a Turkish bath once or twice a week and sneaking off to one corner, wrapping himself in a towel and urinating or defecating as the case might be and hiding the result of his performance. Now can you explain this in any other way than as a desire to get back to the infantile diaper condition?

Every psychopathological situation we encounter has a motive. There is nothing that is done that has no definite goal. It may not seem logical but it has invariably a definite core and that core in the majority of cases is infantile. It may seem very fantastic but, when we understand it, it clears things up. You cannot dismiss it by saying that a man is crazy. This young man was not. The compulsion when investigated revealed a purpose. The purpose was to gratify an infantile craving and to relive a pleasure period of his life.

The other case was another one of nocturnal enuresis in a woman of thirty-five, beautiful and apparently physically normal. There was exactly the same underlying mechanism. She did not come for this symptom but because of an assortment of phobias. Again an infantile craving to get back to the days and nights of her childhood. These psychic impulses have been little understood until recently. Now we can probe into the unconscious and, through understanding, effect cures.

THE RADIUM TREATMENT OF CHRONIC MYELOGENOUS LEUKEMIA, WITH A REPORT OF FIVE CASES.*

By I. A. BIGGER, Jr., M. D., University of Virginia.

The characteristic findings in chronic myelogenous leukemia are a great increase in the white cell count, large numbers of neutrophilic myelocytes in the circulating blood, and a secondary anemia. The bone marrow is firm, pinkish gray or yellow and homogeneous, showing great myelocytic proliferation, but little erythroblastic tissue. The spleen is large, firm, and deeply notched. Its structure somewhat resembles that of the bone marrow. The liver tissue is often partially replaced by myelocytes. The pathological process is apparently primary in the bone marrow.

Remissions occur normally in chronic myelogenous leukemia, and may be brought about by the therapeutic use of benzol, X-rays, or radium; or by intercurrent infection. The most satisfactory remissions have been obtained through the use of radium, and cases entirely resistant to benzol or X-rays have responded satisfactorily when treated with radium.

Radium was first used in the treatment of

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myelogenous leukemia by Renon and Degrais in 1910. They reported twelve cases in 1914 and numerous cases have been reported since that time, practically all giving satisfactory temporary remissions.

The radium may be applied over the spleen, over the marrow of the long bones, or in both places. The most rapid remissions are obtained by treatment over the spleen, and it is apparently less dangerous. Intensive treatment over the long bones may cause injury to the erythroblastic tissues with a resultant severe aplastic anemia. A very large number of myelocytes are collected in the spleen and are more easily exposed to the radiations than in other parts of the body. The dosage varies considerably with different workers; Metcalf advises massive doses at infrequent intervals, but the majority of observers advise moderate doses at intervals of from four to six weeks until the leucocytes fall to 15,000 or thereabouts.

Here following radiation over the spleen, one notes rapid fall in the number of white cells in the circulating blood; the spleen decreases rapidly in size but not so rapidly as the decrease in the white blood count; there is an increase in the number of red cells and hemoglobin content, with a rapid improvement in the patient's general condition.

The remissions may last for months or even years, showing there is more than a mere destruction of myelocytes in the spleen and circulating blood. The prolonged remission may be due to the destruction of large numbers of myelocytes in the spleen and blood stream; radiation over the spleen causes a fibrosis, thus retarding the formation of myelocytes in that organ; a small part of the rays are carried to the bone marrow producing an inhibitory effect on the myeloblastic tissue, and it is possible a leucotoxin is formed by the action of the rays on the myelocytes in the spleen.

Although the remissions may last for months or years, there is always a recurrence and subsequent remissions are increasingly difficult to obtain.

TECHNIQUE OF APPLICATION. In our series of five cases of chronic myelogenous leukemia, treated with radium, we have used the following methods: One hundred milligrams of radium bromide was used routinely; raised one inch from the surface and screened by one millimeter of lead. The area over the spleen

was divided into areas two inches square, each area receiving 300 milligram hours.

REPORT OF CASES.

CASE I. Mrs. E. C., white, age 21 years, admitted to the University of Virginia Hospital, April 3, 1922.

Complaint: Weakness and abdominal discomfort.

Family history and past history: Negative.

Present illness: The patient has noticed gradually increasing weakness since May, 1921. In September, 1921 she began having attacks of generalized abdominal discomfort accompanied by headache, nausea, and diarrhea. She did not menstruate from September, 1921 until January, 1922. In December, 1921 she passed considerable blood by bowel. Patient first noticed a mass in the upper left abdomen in September, 1921. Rather rapid growth since that time.

Physical examination: Pale, poorly nourished woman, apparently about 25 years of age. Palpable inguinal and axillary glands.

Abdominal examination: Abdomen distended. Palpation reveals a mass extending from the left costal margin to the brim of the pelvis, firm, smooth, and deeply notched. The liver is only slightly enlarged.

Examination of blood shows: White blood cells, 278,000 per c. m. m. of blood; Red blood cells 3,500,000 per c. m. m. of blood; Hemoglobin fifty-five per cent (Dare); Differential count shows neutrophilic myelocytes, fifty-two per cent; Wassermann negative.

April 8th—4,200 mg. hrs. of radium; 300 mg. hrs. to each of fourteen areas.

April 17—White blood cells, 56,000 per c. m. m. of blood; Red blood cells 3,650,000 per c. m. m. of blood; Hemoglobin fifty per cent (Dare).

April 22nd—White blood cells, 58,000 per c. m. m. of blood.

April 25th—White blood cells, 60,000 per c. m. m. of blood.

May 1st—White blood cells, 30,000 per c. m. m. of blood.

May 6th—300 mg. hrs. radium to each of 9 areas—2,700 mg. hrs.

May 8th—Red blood cells, 4,920,000 per c. m. m. of blood.

May 8th—White blood cells, 32,000 per c. m. m. of blood. Hemoglobin eighty per cent (Dare).

May 13th—White blood cells, 12,000 per c. m. m. blood.

At this time the spleen reached to the level of the umbilicus and to the midline. Her general condition was very much improved. Heard from on June 25, 1922, stating that she was very much improved. She did not return for further treatment.

CASE II. C. M. Female, colored, age 38 years. Admitted to the University of Virginia Hospital on February 8, 1922.

Complaint: Nausea, weakness, and a tumor in the abdomen.

Family history and past history: Negative.

Present illness: The patient noticed a mass in the upper left abdomen about six months before admission. It has increased rather rapidly in size. Patient is always nauseated after meals.

Physical examination: The patient is a poorly nourished, anemic white woman apparently about 35 years of age. Inguinal glands are palpable.

Abdominal examination shows a firm, smooth mass extending from the left costal margin to within two inches of the pubis. Deeply notched, and evidently an enlarged spleen. The liver extends two inches below the costal margin.

Examination of blood shows: Red blood cells, 3,800,000 per c. m. m. of blood; Hemoglobin seventy per cent (Dare); White blood cells, 560,000 per c. m. m. of blood; Differential count shows sixteen per cent neutrophilic myelocytes; Wassermann negative.

February 14th—White blood cells, 690,000 per c. m. m. of blood.

February 17th—400 mg. hrs. of radium applied to each of sixteen areas—6400 mg. hrs.

February 24th—White blood cells, 202,000 per c. m. m. of blood.

March 3rd—White blood cells 114,000 per c. m. m. of blood.

March 3rd—400 mg. hrs. of radium applied to each of eleven areas—4,400 mg. hrs.

March 10th—White blood cells, 62,000 per c. m. m. of blood.

March 17th—White blood cells, 27,000 per c. m. m. of blood.

March 17th—400 mg. hrs. radium applied to each of three areas—1,200 mg. hrs.

March 26th—White blood cells, 10,000 per c. m. m. blood. Neutrophilic myelocytes six per cent. The spleen reaches nearly to the level of the umbilicus, and within one inch of the midline. General condition very good.

July 20th—General condition very good.

White blood cells, 55,000 per c. m. m. of blood. Red blood cells 4,800,000 per c. m. m. of blood neutrophilic myelocytes fourteen per cent. She was found to be about four months' pregnant.

July 20th—300 mg. hrs. radium applied to each of six areas—1,800 mg. hrs.

September 1, 1922—White blood cells, 23,000 per c. m. m. blood; Red blood cells, 4,500,000 per c. m. m. blood. The spleen reaches about two inches below the costal margin.

September 2nd—300 mg. hrs. radium applied to each of three areas—900 mg. hrs. total.

October 12th—White blood cells, 64,000 per c. m. m. blood; Red blood cells, 4,000,000 per c. m. m. blood; neutrophilic myelocytes forty one per cent. Temperature on admission ninety-nine degrees.

October 14th—300 mg. hrs. radium applied to each of six areas—1,800 mg. hrs.

October 16th—White blood cells—30,000 per c. m. m. blood.

October 17th—Delivered of seven months' (stillborn) fetus. Patient had two weeks of practically normal puerperium.

November 7th—White blood cells, 21,000 per c. m. m. blood. Temperature 103 degrees. Blood cultures and Widal test negative. Smear negative for malaria.

November 17th—900 mg. hrs. radium, 300 mg. hrs. to each of three areas.

November 20th—White blood cells, 17,500 per c. m. m. blood. Myelocytes six per cent; Myeloblasts twenty-four per cent.

November 23rd—White blood cells, 14,500 per c. m. m. blood. Temperature 104 degrees—105 degrees. The spleen reaches almost to the brim of the pelvis.

November 24th—Lethal exodus. Autopsy refused.

CASE III.—Mr. J. R. White, age, 62 years. Admitted to the University of Virginia Hospital, September 12, 1922.

Complaint: Weakness and a tumor in the upper left abdomen.

Family history and past history: Unimportant.

Present illness: He has noticed a gradual loss of strength during the past three years. The mass in the upper left abdomen was not noticed until one week before admission.

Physical examination: Well developed and well nourished white man apparently 60 to 65 years of age. No glandular enlargement. Temperature normal. Abdominal examination shows the spleen reaching from the left

costal margin to the umbilicus. The liver is not enlarged. Wassermann is negative. White blood cells, 140,000 per c. m. m. blood. Red blood cells 4,600,000 per c. m. m. blood. Hemoglobin eighty per cent (Dare). Neutrophilic myelocytes thirty per cent.

October 11th—2,100 mg. hrs. radium, 300 mg. hrs. to each of seven areas over the spleen.

November 2nd—White blood cells, 12,000 per c. m. m. blood; Red blood cells, 5,000,000 per c. m. m. blood; Neutrophilic myelocytes five per cent. The spleen reaches about two inches below the costal margin. General condition good.

March 5th—White cells, 11,200 per c. m. m. of blood; Red cells, 3,000,000 per c. m. m. blood; Hemoglobin sixty-five per cent (Dare); Neutrophilic myelocytes one and five-tenths per cent. Spleen just palpable. General condition good.

CASE IV. Mrs. L. A. White, age 45 years. Admitted to University of Virginia Hospital, May 11, 1922.

Complaint: Persistent nausea and weakness.

Physical examination: A rather anemic, obese, white woman, with no glandular enlargement.

Abdominal examination shows a small easily reducible umbilical hernia. The spleen reaches about four inches below the left costal margin. The liver projects about 1 inch below the right costal margin.

May 11th—White blood cells, 47,000 per c. m. m. of blood; Red blood cells, 3,400,000 per c. m. m. of blood; Hemoglobin eighty per cent (Dare); Neutrophilic myelocytes thirty-one per cent.

May 19th—2,400 mg. hrs. radium. 300 mg. hrs. to each of eight areas over spleen.

May 22nd—White blood cells, 42,000 per c. m. m. of blood.

June 1st—White blood cells, 69,000 per c. m. m. of blood.

June 5th—3,200 mg. hrs. radium. 400 mg. hrs. to each of eight areas over spleen.

June 13th—White blood cells, 19,500 per c. m. m. of blood.

July 22nd—White blood cells, 5,000 per c. m. m. blood; Red blood cells, 4,000,000 per c. m. m. blood; Neutrophilic myelocytes ten per cent. The spleen was just palpable beneath the left costal margin, and general condition was very much improved.

March 12th—White blood cells 70,000 per c. m. m. blood; Red blood cells 3,800,000 per

c. m. m. blood; Neutrophilic myelocytes forty-two per cent.

March 18th—1,800 mg. hrs. radium. 300 mg. hrs. to each of six areas over spleen.

April 4th—White blood cells, 12,000 per c. m. m. blood. General condition good.

CASE V. B. F. Admitted to University of Virginia Hospital, June 22, 1922. White, female, age 12 years.

Complaint: Weakness and an abdominal tumor. The mass in the upper left abdomen was noticed about thirteen months before admission to the hospital. Has increased rather rapidly in size, and accompanying this there has been a progressively increasing weakness. One month before admission to the hospital patient had a severe nasal hemorrhage. Physical examination shows an anemic, poorly developed, and poorly nourished white girl apparently 10 to 12 years of age. No glandular enlargement.

Abdominal examination. The spleen almost entirely fills the left side of the abdomen, and extends about two inches to the right of the midline, firm, smooth, and deeply notched. The liver is only slightly enlarged.

Temperature on admission 100 degrees F.

White blood cells, 257,000 per c. m. m. blood; Red blood cells, 2,670,000 per c. m. m. blood; Hemoglobin fifty per cent (Dare).

June 26th—3,000 mg. hrs. of radium. 300 mg. hrs. to each of eleven areas over spleen.

July 7th—White blood cells, 51,000 per c. m. m. blood.

July 13th—White blood cells, 17,000 per c. m. m. blood.

July 13th—1,200 mg. hrs. radium. 300 mg. hrs. to each of four areas over spleen.

August 17th—White blood cells, 9,000 per c. m. m. blood; Hemoglobin seventy-five per cent (Dare); Neutrophilic myelocytes one per cent. The spleen reaches about two inches below the left costal margin. General condition excellent.

November 25th—White blood cells, 55,000 per c. m. m. blood. 2,400 mg. hrs. radium applied. 300 mg. hrs. to each of eight areas over spleen.

March 10th—White blood cells, 47,000 per c. m. m. blood. 1,500 mg. hrs. radium. 300 mg. hrs. to each of five areas. Patient in very good general condition, but has had several severe nasal hemorrhages.

CONCLUSIONS

(1) We have obtained very satisfactory temporary remissions in all of our five cases of chronic myelogenous leukemia treated with radium.

(2) Case No. II developed an acute leukemia, and there was a lethal exodus.

(3) Radium seems to have no effect on the acute leukemias.

(4) Surface applications over the spleen with moderate dosage seems the safest and most efficient plan of treatment.

(5) With our present methods radium is not curative, but is our most satisfactory agent in the treatment of chronic myelogenous leukemia.

(6) With improvement in the technique of application we should obtain more satisfactory and more lasting remissions.

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EYE INFLAMMATIONS CAUSED OR INFLUENCED BY DENTAL SEPSIS. REPORT OF CASES.*

By CLARENCE PORTER JONES, M. D., F. A. C. S.,
Newport News, Va.

Just how does focal infection act in the mischief wrought is an unsettled fact, whether by bacterial invasion through the bloodstream or lymph stream, by toxins or perhaps both.

From my record for this year (1923), six months, I pick out 13 cases; from each I learn something worth while.

IRITIS: FIVE CASES.

Mrs. A., 56 years, history of rheumatism, negative Wassermann. Seen first on April 19. There was a plastic adhesion of iris to lens capsule; it was impossible to get a dilatation of the pupil worthy of the name, although 3 per cent atropine was instilled every 3 hours, finally every hour, this supplemented by daily

subconjunctival injections of atropine, 1/150 grain. On May 3, all of her teeth, eleven in number, were extracted, each tooth or its gum being infected. On May 5, all pain had disappeared, there being a maximum dilatation of the pupil. Treatment was discontinued and she has remained well. The striking point here was the apparent "iron bound," so to speak, adhesions to the lens capsule, melting away like snow in 48 hours after the removal of the focus.

Mr. H., 29 years, iritis and episcleritis. Negative Wassermann. There was pyorrhoea alveolaris in four teeth. Prompt and thorough dental care for twenty days caused a disappearance of the symptoms.

Mr. E. C. H., 58 years, iritis, positive Wassermann. He had an attack about a year ago, whose acute symptoms, pain, photophobia, etc., disappeared spontaneously upon the extraction of an abscessed tooth; he was remanded to an internist for general treatment. In January he was suddenly seized with a most violent uveitis, same eye. The usual remedies were vigorously employed, 3 per cent atropine every hour, without any but a moderate dilatation of the pupil, and without any relief from pain. A limited amount of morphine was allowed, as his suffering was intense. This condition lasted for three weeks till his dentist was prevailed on to remove the crown from two teeth, exhibiting hidden necrosis with a most foul odor. These teeth were extracted. In six hours all pain was gone and a sufficient pupillary dilatation was now easy to get. The usual treatment was continued till the cornea became clear and the eye became quiet, which required ninety days, yet there was no more pain or discomfort. He returned to work two days after the teeth were extracted, and has been at work ever since.

Mrs. G., 34 years, uveitis. Positive Wassermann. Last September she had fine opacities of the vitreous of the left eye and a mild iritis, which cleared up promptly after extraction of nine pyorrhoeic teeth. Similar to the last case, she was taken in February, with uveitis of a most violent type, in the same eye. Being encouraged, a more prompt study of her case was made. Roentgenograms of the sinuses showed no pathology; those of the jaws revealed two teeth with apical abscesses. These were extracted. In thirty-six hours every vestige of pain was gone and has not returned.

*Read before the Ophthalmic and Aural Section of the Norfolk County Medical Society, June 28, 1923.

She resumed her work, proof reading, in three weeks after the teeth were extracted.

Wm. J., colored, 63, iritis, positive Wassermann. The case presented difficulties in diagnosis in its early stage, symptoms so much like glaucoma that it was necessary to measure the tension, which was 38 m.m. (McLean), several days later, however, unmistakable signs of iritis were present. As in the other cases, a satisfactory pupillary dilatation was impossible to obtain. His mouth was a veritable dental "Curiosity Shop," queer shaped teeth, a variety of colors, several sometimes in the same tooth, the gums were all infected and each tooth was either pyorrhoeic or abscessed. All teeth, seventeen in number, were extracted, nine one day and eight the next. All pain and discomfort disappeared within twenty-four hours, the pupil readily dilated and the patient resumed his business, a fish merchant.

The facts learned from these last three cases compel me to regard focal infection as an important element in syphilitic iritis. We should not say with a cynical shrug of the shoulder, "there you are," and let it go at that, when we find syphilis; but look most diligently for contributing causes and remedy the same. The sudden relief from pain and the easy dilatable pupil in all five of the cases is indeed spectacular.

CORNEAL ULCERS. TWO CASES.

Mr. A., 26 years, two ulcers on right eye. One was about 2 m.m. in diameter, the other smaller; negative Wassermann. He was seen March 29. Most careful treatment was instituted with no apparent improvement, until two abscessed teeth were extracted, on April 11. Pain was relieved, and on April 19, he was dismissed, healing being complete. I saw him five days ago and he has remained well.

Mrs. R. L. H., 43 years, was seen May 20, with a large superficial central ulcer of the left cornea. She had a variety of dental disorders—gum abscesses, cavities, broken teeth and pyorrhea. She was sent to a careful dentist, who immediately begun to clean up the premises. In the meantime, she came daily for treatment of the ulcer, but had no relief from pain or apparent healing. There was remaining one suspicious tooth, which she seemed to regard as a pet, and was loath to part with. Finally, on June 16, she consented

to its extraction, it being abscessed at its apex. The next day she returned in a happy mood; she informed me she slept through the night without waking, and that she had no pain whatever. The ulcer has healed, and, owing to its shallowness, the scar is thin, allowing 20/50 vision.

I learn from these two cases, in the language of the pugilist, "Something must be holding it up," and it behooves us to search for this something and remove it.

GLAUCOMA. ONE CASE.

H. E., 52 years, was seen first time over two years ago. His right eye was glaucomatous; it was divergent and amblyopic since childhood, the nerve head was cupped, vision reduced to light perception. The tension was 88 m.m. (McLean); the fellow eye was normal, tension 29 m.m. He said that he had recently had an attack of tonsillitis, that for several years he had had three or four attacks of tonsillitis each year, and that each attack was always followed by severe pain in his blind eye, together with some nausea. This would last for about two weeks, then he would have relief till the next tonsillitis, etc. He had a negative Wassermann. I enucleated his tonsils while he was suffering from the glaucoma attack. There was prompt relief from ocular pain, the tension dropped about 20 m.m. and the eye remained quiet till February, this year, when the glaucomatous pain returned. His tension then was 96 m.m. (McLean). Roentgenograms of his sinuses showed no pathology; those of his jaws revealed an abscessed anterior molar tooth. This was extracted. The pain straightway left the eye, the tension dropped to around 65, and the eye became quiet, and is still so. Was not glaucoma induced by focal infection? Is it not fortunate for him that the useless eye was attacked instead of the fellow eye?

EPISCLERITIS. TWO CASES.

There was nothing spectacular in either case, the ages being 38 and 41, respectively. Each showed a negative Wassermann. Each had relief from extraction of abscessed teeth. In even recent years one is at times desperate in observing the extreme slowness oftentimes in the progress of this disease. While two swallows do not make a summer, yet I gleam a ray of hope from the results here.

OPACITIES OF THE VITREOUS, WITH MENTAL SYMPTOMS. ONE CASE.

W. A., 54 years, was seen March 27. He complained of suffering from a vague headache, as he expressed it, and tiny yellow butterflies in front of his right eye; said about 4 o'clock each day he began to lose himself, not knowing just where he was. He is a school principal and always would go immediately home, which was a few hundred feet from his school, to be with his family. Said he had a feeling, if the family would leave him alone, that something would come and get him. About 9 o'clock this feeling would leave him and he would get a fair night's rest, thus going through this cycle day after day. He had a negative Wassermann. The ophthalmoscope showed fine opacities in the vitreous of the right eye. The roentgenograms showed nothing except a canine tooth with an apical abscess.

The dentist did what I consider a questionable thing, i. e., drilled to the tip of the tooth, cleaning out the abscess, leaving the tooth *in situ*. However, the vague headache and mental symptoms disappeared promptly. The "yellow butterflies" ceased to "fly" in about three weeks. He is now well and has had no return of the symptoms.

Comment on this case is difficult to make. Its understanding is hard. The results are most gratifying.

MIGRAINE. ONE CASE.

Mrs. L., 37 years, complained of ocular migraine of three months' duration, seizures lasting about six hours, three or four per week. Her refraction was measured to find her eyes emmetropic, and her muscles balanced. She had four impacted wisdom teeth and two pyorrhoic teeth. A dentist gave her careful attention. She is not well, although she has seizures much less frequently, and much less severe, so there is encouragement.

ORBITAL NEURALGIA. ONE CASE.

Mr. S., 72 years, was seen May 17. He was the most intense sufferer from this symptom I ever saw. He had received morphine in half grain doses for ten days, yet his expressions were pathetic, moans, groans and screams. The left eye was injected and was the seat of the pain. There was no disturbance of vision and the ophthalmoscope showed no pathology. The

conjunctiva was red. There was some increase of pain upon exposure to light, but a draught of air, even the breath from a bystander, would bring on a paroxysm lasting about three minutes, of the acute suffering as above described. Roentgenograms of his sinuses showed no pathology, but his seven teeth, all he had, were abscessed. These were extracted.

I lost sight of him till last week, when the dentist received a letter from him saying he is well and about his business. He is a farmer.

A careful study of one's cases is not only a duty to the patient, but it adds zest to one's life's labor.

3117 West Avenue.

ASPIRATION OF CEPHALHEMATOMA OF THE NEW BORN.*

By BURNLEY LANKFORD, M. D., Norfolk, Va.

Cephalhematoma and caput succedaneum are not the same condition, though they are given as synonymous in Dorland's dictionary.

Some months ago the former condition developed in a child delivered by me, the course of which was different from the usual one, and which gave me some little concern. Active treatment, such as will be advocated below, would have influenced this untoward course for the better. True cephalhematoma must be differentiated from caput succedaneum and from meningocele. It is much less frequent than caput, and more frequent than meningocele. Briefly the points of difference are the following.

A caput is always present at birth, a hematoma may be present then or it may develop within three days. A caput is a rapid effusion of serum, a hematoma is a slow effusion of blood. A caput tends to decrease after birth, a hematoma may, and usually does, increase for several days and may continue to increase for a week after birth. With a caput present, the skin over the swelling is darker than the rest of the scalp; with hematoma there is no discoloration of skin. A caput never fluctuates but has a doughy feel. A hematoma does fluctuate. The swelling produced by a caput may cross a suture line; that of a hematoma does not. The *feel* of the underlying bone around a caput does not suggest a depressed fracture; that around the edge of a hematoma does feel exactly like a depressed fracture.

*Read before the Norfolk County Medical Society.

Last, a caput disappears within a few days, a hematoma is *said* to disappear within one to three months, but all of them do *not*.

A meningocele pulsates with the heart, and becomes tense when the infant cries, which characteristics should easily and quickly differentiate it from either of the other two conditions.

All text books say that cephalhematoma requires no treatment unless suppuration ensues. This I believe to be not good advice, and for several reasons. The case below is cited as one reason.

The infant a male, was born to a primiparous mother of thirty-four years, after a spontaneous labor. The pelvic measurements were all adequate. The perineal stage of labor was a little longer than the average, due to very resistant outlet muscles. Neither of these factors however (time and resistant muscles) were more marked than hundreds of other cases showing no hematomas in the babies.

At birth this infant's head showed no swelling other than a small caput. Twenty-four hours after birth the nurse called my attention to a swelling over the right parietal bone, which she said was just becoming noticeable. This continued to increase for several days, finally becoming approximately 8 cm. long, 4 wide and 3 deep. Forty-eight hours after birth an occipital swelling appeared, which within two days became approximately 3 cm. in all three dimensions. Following the let alone advice of the past, these were let alone, the parents and grandparents assured that the tumors would disappear within a few weeks, a month or two at most.

Neither of these swellings seemed tender at any time, nor did they seem to give the baby any discomfort. The reason for reporting this case is to question the wisdom of the usual "let alone" advice. Six months after birth there still remains marked deformity of the baby's skull, and the condition, while not serious nor dangerous, has given the parents a deal of concern and brought into disrepute the prognosis given at time of birth. These swellings, after about ten days, began to give a parchment like feel to the palpating finger, they daily grew thicker and harder and after a month were apparently solid bone, and as such they have remained. This could all have been avoided if the effused blood had been aspirated as soon as it stopped collecting.

The cause of hematoma of the new born

cannot always be determined. Certainly trauma during passage of the birth canal, whether spontaneous or the result of instrumental delivery, often seems to be the cause. When trauma, associated with the hemorrhagic diatheses, occurs in the same birth, the conditions would seem to be just right for this type of hematoma.

If the swelling comes on early and increases rapidly, it will be good therapy to give a subcutaneous injection of whole mother's blood, 10 c.c. followed in a few hours by 10 more. When the swelling has ceased to increase, it seems to me that the proper treatment should be aspiration. This should be done with a rather large sized needle, attached to a Luer syringe, so that suction may be applied. By the use of a needle, syringe and suction, rather than a trocar, a much smaller opening is possible and the risk of infection minimized. The hair should be shaved and the skin carefully prepared with iodine and alcohol. It may be necessary to repeat the aspiration twenty-four or forty-eight hours later.

Since the above case, I have treated two cases of cephalhematoma in the new born by the above method, with perfect results.

530 Shirley Avenue.

THE ROENTGENOLOGIST AND THE REFERRING PHYSICIAN: THEIR RELATIONS.*

By J. E. HARRIS, M. D., Winchester, Va.

The purport of this short paper is not scientific as can be inferred from its title. Instead of occupying the happy and coveted position of a veteran in this field of special work, I am only a private in service. However, as far back as the year 1904 I owned and operated an X-ray machine in conjunction with my general practice, but it was not until this last year that I gave up general practice and began to devote all of my time to this line of work as a specialty. This being the case it would be breech of good judgment for me to attempt to discuss scientifically the many problems that now confront us in the X-ray field of diagnosis. The great trend of the profession today is towards the fields of specialism which makes it incumbent upon those doing special work to strive the more persistently to be original in their special lines. Unless I could present to you some new phase of the work

*Read at the meeting of the Medical Association of the Valley of Virginia in Winchester, May 31, 1923.

in my special line, it would be unfair for me to consume your time by presenting a paper based altogether upon what others have already accomplished.

I think the ambition of every man doing special work should be not to do some one thing as good as some one else but to do it better—certainly we should have high aspirations and not be content with even a moderate degree of perfection in our special lines. Every line of business today is becoming saturated with progressive ideas and the science of medicine is no exception to this rule. We cannot practice medicine and surgery today as we did even twenty years ago, because we are living in an atmosphere of forward progression; therefore, the specialist must strive to be as near perfect as possible. *Efficiency* should be the watchword and not *commercialism* as is often the case.

The roentgenologist occupies rather a unique position when compared to men doing work in other special lines—in that the roentgenologist deals with the patient only through the referring physician, which creates an obligation that does not exist in other special lines; therefore it can be readily seen that the relations existing between the referring physician and the roentgenologist of necessity should be most cordial and inspired by real confidence from both sides; if this be the case it will redound to the pleasure and helpfulness of all parties concerned.

The moral obligation from both sides is too important to be overlooked. I am convinced that all medical ethics is founded upon one great principle, and that is the treatment that one gentleman deserves and should receive from another.

When a physician or surgeon chooses to refer his patients to the roentgenologist for examination, he should have the full satisfaction of knowing that the patient will be dealt with scientifically and conscientiously.

The roentgenologist has a moral obligation to both patient and referring physician and just how best to exercise this obligation is a thing that the roentgenologist can only determine.

We should be guided by the golden rule and learn to give and take, as it were. Within the past few years roentgenology has taken a permanent stand in the ranks as a recognized specialty in the diagnostic field. While this

is true we must not forget that the roentgen ray has its limitations of usefulness.

We must not expect it to reveal the things impossible. If you will keep in mind the physical laws relative to all light rays, you will readily understand that we are dependent upon the density of tissues to the ray penetration for our findings.

We are handicapped oftentimes by unusual circumstances and conditions over which no one has any control and for that reason our patience is often taxed to the limit of endurance before we can conscientiously report our findings. Often we have to request a second examination in order to verify the findings in the first, before we can report.

Quite often delayed reports seem to displease the referring physician.

In the rush of business and for the want of time, it is sometimes perplexing for the referring physician to have to wait for a report and I am sure every roentgenologist shares this feeling with him; but on the other hand, the roentgenologist deserves some consideration and the delay and the time consumed in his painstaking procedure should commend itself to you rather than provoke you, so that your co-operation in this matter will be appreciated by all roentgenologists.

The value of the science and the usefulness of it are no longer questionable in the minds of progressive medical men and modern surgeons. The usefulness of it to a given community, however, depends largely upon the frequency with which it is used. Just how much help the roentgenologist can be to the referring physician depends somewhat upon how much they seek to use him.

All physicians and surgeons frequently have obscure cases coming up for diagnosis and many of these will have been the rounds from one physician to another for sometime until they have gotten into what we term the chronic stage. This class of patients not only deserve a large share of our sympathy but demand oftentimes the taxing of our professional skill to its limits; and it is in these cases that we should exhaust every means at our disposal in order to make a correct diagnosis.

Should we succeed in these cases, we should not aspire to the one pecuniary reward as full payment for services but that greater reward which lies in the fact that we have discharged our conscientious as well as professional duty in accomplishing something that was not only

necessary but something that had not been accomplished before.

While roentgenology is comparatively of modern creation, at the same time its usefulness is so apparent that we should banish the idea from our minds that it is a new thing in the line of scientific discovery. Its use has certainly passed the experimental stage; yet, at the same time, a large percentage of the profession have very vague ideas as to its limitation and usefulness. Time and service will certainly correct these ideas.

It was predicted that after the late war the public would have thrust upon it a large number of men who, for the want of time, were poorly trained in the use of the X-ray and, for pecuniary reasons, would seek to use the roentgen ray unscientifically, but I am glad to say that this has not been the case to the extent that was predicted, because in many states an examination of proficiency is being required of both technicians as well as roentgenologists. While it is true the country needs and demands more men in this field of work, yet I believe there should be an increase in quality as well as quantity.

They should be more conservative in their ideas and broader from an educational standpoint. In passing, it might be well for me to state the difference between an ordinary technician and a roentgenologist.

A technician is one who (often a layman) is master of the technique in operating the machines and making the exposures but without medical training. The roentgenologist is one who is not only master of the technique but has a thorough knowledge of medicine and has been well trained as such. The average technician can never make a safe roentgenologist, due to his lack of medical knowledge. The roentgenologist must be a well trained medical man and have a thorough knowledge of anatomy, pathology and histology and, if he has had several years of general practice to his credit, it will prove an invaluable asset. The correct interpretation of the X-ray findings as depicted on the plates or films is the real scientific part of the work and to be proficient in this requires close attention and constant study in conjunction with good sound judgment.

While I am a firm believer in the use of the rays and think that we should use them more than we do, yet I think we should always have a good reason for subjecting a patient to an

X-ray examination—we ought to expect to accomplish something by the examination. It is true not every examination is positive, but quite often we are more pleased to render a negative report than we are a positive one. Its use should have a real value and to use it for the want of something to do should be discouraged. In the hands of unscrupulous operators it is being used with great success to play upon the receptive minds of the neurotics.

But I am glad to say that the referring physician does not contribute to this kind of fakery because, as these fakirs are known to the referring physician through the victims, he does not refer his patients to this class of men.

Oftentimes the roentgenologist is inclined to disregard all other clinical data except that which is depicted on the plates or films by the rays; to do this I think is a great mistake, as certainly in many cases the X-ray findings should be only a link in the diagnostic chain. Not one of us is infallible and we are all liable to make mistakes; if we do, we should do the square thing by admitting it and then seek to correct it.

Of course the roentgenologist should realize his obligation to both patient and referring physician. A square deal is what one physician demands from another and, if this rule is adhered to, the relations between the roentgenologist and the referring physician will be most pleasant.

Ordinarily speaking, the referring physician sends his patients to the roentgenologist only for examination and not for treatment, unless so specified; therefore, after the X-ray examination, it would be highly unethical for the roentgenologist even to suggest a line of treatment in the case, or to suggest that certain physicians or surgeons be consulted in the case. This is a matter to be decided by the referring physician and the patient and not by the roentgenologists. To be guilty of this would be a breach of confidence on the part of the roentgenologist who should be a friend and consultant, as it were, to every physician and surgeon within his territory. They should bear the most cordial relations towards each other and be free to work amicably together for the good of the cause. I further think that it would be most unwise for any roentgenologist to ally himself exclusively with any clique or set of physicians in a community because the services of the roentgenologist should be

at the command of every physician in the community in which he lives. He should so conduct himself towards the profession that, when physicians referred their patients to him, they would feel that not only would the patient be cared for scientifically but that the referring physician would get a square deal as well.

It is assumed, of course, that when you refer patients to the roentgenologist you have confidence in his ability and integrity and this same degree of confidence should be reciprocated by the roentgenologist.

When the referring physician receives the report from the roentgenologist, should it not meet with his wishes and approval, it would be unfair for him to evidence his displeasure by making an unkind criticism of it, by word or act, to the patient. I have heard of this being done in some instances and, while it may be self-serving for the referring physician at the time, it will in due time invariably be brought back to the roentgenologist, most likely by this same patient or some of his friends.

If the referring physician is not satisfied with the report, he should seek to assure himself of its correctness by communicating with the roentgenologist and, if necessary, go to see him and get an explanation. If this is done I am sure that an agreement satisfactory to all parties will be reached.

It is well to remember that every film in the office of a modern roentgenologist is on file by name and number, can be found instantly, and that these films and all records relative to his cases are always open to the inspection of the referring physician.

These films are legally the property of the roentgenologist. The patient has no claim on them at all but has a right to a copy of the report of the examination in his case. The fees charged by the roentgenologist are not for the film or plate made but for the opinion of the roentgenologist based on the X-ray findings in the case. The charges are not made as so much per plate or exposure but it is for what these plates or films reveal, whether there be one or twenty.

To maintain a conservative attitude in this work is most necessary and at the same time quite difficult as we are prone to see too much rather than too little. The best work and the best results demand full co-operation from both sides. Impatience on the part of the referring physician will soon lead to the sever-

ance of cordial relations. You should demand good and prompt service from your roentgenologist and in return you should give him your moral support rather than condemn him for his painstaking procedure.

DISCUSSION.

DR. W. M. PHELPS, Staunton: I am glad that Dr. Harris has had opportunity to present the subject of the roentgenologist in his relation to the referring physician. It is an important subject, and some physicians seem to have vague ideas as to the relations that should exist. One day a patient who had been in my office went by with some friends, and, pointing to the office, said, "That is the place where they made an electric picture of my stomach." Some of the indefinite directions as to what the referring physician wants often remind me of that lady. We must remember that roentgenology is only one factor in the diagnosis, and in order to make it valuable it is necessary that the roentgenologist and the physician co-operate, and the referring physician should familiarize himself with the procedure of roentgenologic work, and send with the patient definite data as to what he wants done. A tentative diagnosis from the physician would help the roentgenologist in determining the best technic to use to bring out the points required.

DR. F. M. HANGER, Staunton: I just want to speak a good word for X-ray work in my line. I had the good fortune to become a specialist before the X-ray was in existence, and well I remember how I would blunder along in diagnoses in cases of ethmoiditis and maxillary and other nasal sinus infections. I could not determine where the pus was coming from. Then, again, in doubtful cases of mastoiditis when you want to know whether an operation is necessary, X-ray is indispensable. X-ray now makes you sure whether the bone is involved and operation indicated. I feel that it has not made me careless in my work, but when I have a sinus trouble to examine, why worry, just leave it to the X-ray man and he helps me out. I have used trans-illumination for many years; but, barring the maxillary sinus, it is misleading and cannot be relied on. I feel now that I don't know how I ever got along without it. I think it one of the greatest blessings to the specialist, almost as great as the ophthalmoscope. Just think of the ignorance on the part of the specialists, in the old days, before they could look into the eye and determine just what disease was to be found there. Every eye that became blind or nearly blind was called amaurosis. They just guessed as to what was wrong; there was nothing definite. It is invaluable to us, and to the general practitioner, to examine the eye and know definitely what we are doing and what is best for the patient.

FOCAL INFECTION FROM THE SPECIALIST'S VIEW POINT.*

By D. L. RAWLS, M. D., Suffolk, Va.
Eye, Ear, Nose and Throat Department, Lakeview Hospital.

The subject I have selected not only concerns the eye, ear, nose and throat specialist, but all branches of medicine as well. It is often very difficult to draw a distinct line between the

*Read at the meeting of the Southside Virginia Medical Association in Petersburg, March 13, 1923.

various fields of medicine, for they merge into each other, but for practical purposes we have what we call border lines. Suffice it to say, however, we must have some knowledge of all, in order to accomplish the greatest good for both patient and doctor. It does not matter whether we are general practitioners, general surgeons, ophthalmologists, oto-laryngologists, gastrologists, neurologists, or what not, the idea is, we must be alert to recognize the S. O. S. call, so to speak, that the victim may be rescued from an infected grave.

The question often arises, as to whether the medical science of today is not developing too much into specialization. All of us recognize that the constantly increasing range of medical knowledge has necessitated specialization, and that we probably have not yet reached the limits. The potent factor in this great change has not only been increased medical knowledge, but the modern desire to become more efficient. This metamorphosis of the physician from a general practitioner to a specialist has not only made great strides in medical science, but has unquestionably had its drawbacks. It is not our aim, however, to grow apart but, to the contrary, to become more and more intimate with each other.

I don't know of any topic in the whole category of medicine which is more important than the subject of focal infection. Here it is we come together, shoulder to shoulder, in order to make a diagnosis. All of us well know that, with all our modern equipment and knowledge, it is often very difficult to locate some obscured focus of infection that is doing untold damage to the patient. When we think of the anatomical structure of the head, with its multiplicity of minute ramifications, we can readily understand why this is the most frequent seat of all the human body, for focal infection. While there is no question that a great majority of the foci of infections causing local and systemic diseases occur in some part of the head, yet we must not ignore other infecting areas of the body, as the gall-bladder, appendix, prostate glands and seminal vesicles, pus tubes, infected bronchi, etc. The fact that so many infecting foci occur in the field embraced in our specialty places a great obligation upon us, not only to search with painstaking care every possible area of infection within the field of our special work, but also to inform the profession in general of the great danger that is often lurk-

ing in this region, such as the tonsils and adenoids, teeth, and the alveolar processes, salivary glands and ducts, the middle ear and mastoid cells, the nasal accessory sinuses, lacrimal glands and duct, etc.

The microorganisms that are most frequently found in the above structures are the staphylococci and streptococci of various forms, pneumococcus, diphtheria and pseudodiphtheria bacillus, tubercle bacillus, grippe bacillus and micrococcus catarrhalis. These organisms reach the system either through the blood stream or the lymphatics, more frequently by the former. After reaching the general circulation they find lodgment in the capillaries and terminal arterioles, producing capillary embolism. When bacteria are halted in the blood stream, there is produced at the site, proliferation of the endothelial lining and an exudate of leucocytes and plasma cells. It would be easy for a focus in chronically diseased tonsils or elsewhere in the head to cause serious lesions in distant organs without attention being directed to the primary focus. It is remarkable how many people go about harboring these infected foci with no local or systemic symptoms. However, when one's resistance is lowered by overwork, bad hygienic surroundings, undernourishment, exposure to heat and cold, or excess of any kind, the confined focus may become active and there ensue symptoms of both local and constitutional disease.

Some of the diseases which may have their origin in foci of infection in the head are rheumatism, endocarditis, pericarditis, myocarditis, chorea, pleuritis, arthritis, nephritis, gastric and duodenal ulcer, cholecystitis with and without gall-stones, pancreatitis, neuritis, appendicitis, myositis, adenitis, thyroiditis, osteomyelitis, spinal myelitis, and bronchial asthma. When we think not only of the damage this infection is doing at its original seat, but the great destruction it has done and is now doing in other parts of the body, it behooves us one and all to get busy and eradicate the foci. Even in far advanced cases, by removing the cause, we have minimized the amount of infection, thereby increased the resistive power of the patient, and cured many systemic diseases.

The question now arises, what is the best means of stamping out this infection? First, I should say preventive methods. It would seem that we, as specialists and general prac-

tioners, should do our part in educating the public to take those precautions which will in a great measure safeguard them from this infection. I will not take your time in describing all the various means of prevention nor will I dwell on the treatment, only mentioning a few. Patients with acute colds should be taught that they are contagious and to cough and to sneeze into gauze to be subsequently burned, just as our tuberculosis patients are required to do. Earache is not to be regarded lightly and requires more than the instillation of sweet oil or laudanum. The public should be instructed in reference to the importance of oral hygiene, teeth, etc. Children should be observed closely for mouth breathing and recurrent attacks of sore throat, for here is the starting point of most focal infections.

I think we, as physicians, with the co-operation of the school board, should devise some means, by which the school children can be examined thoroughly, annually, by competent physicians. We know it is going on now and that some unqualified people are attempting this work; while these may be doing their best under the circumstances, they have not had the proper training in this line. If children were examined properly and treated accordingly, most of what we call focal infection would be a thing of the past.

As I have said in the beginning I will not dwell on the treatment, for the field is too wide and time will only permit the relation of a few facts. There are two well established methods of relieving an individual of an infected focus—one by entire removal and the other by drainage. For an example, in chronic tonsillitis we resort to the former, and in acute sinusitis we do drainage. So serious for the patient is the systemic disturbance arising from foci of infection in the chronic tonsil, that we are rarely justified in the use of halfway measures, as incision of the crypts or the use of the cautery or curette.

In conclusion, I wish to say, as Dr. Joseph C. Beck has well said, "That all those who believe that focal infection is a hobby would do well to adopt it, rather than remain on the outside making unjust and severe criticism without really giving the subject a fair trial."

Reports of Cases

CLINICAL CASE REPORTS.*

(1) Report of Clinical Case by DR. KENNETH BRADFORD, Staunton, Va.

In May, 1921, I presented before the Association a case of splenomyelogenous leukemia in a young man then running a white blood count of 185,000. He had an enormous spleen. Diagnosis made in February was leukemia. He had received radium treatment once prior to the meeting. I told at that meeting of the very severe reaction following the treatment by radium. After six weeks he improved and was able to be at the meeting. He has had in all eleven radiations. Last year he was able to spend five months in college. This year he has been at college since March 1st. He has now increased in weight 15 lbs. The spleen is almost normal in size. The white blood count is under 5,000. I feel that he is not cured, and will need radiation the rest of his life, but it is well worth while if life can be prolonged in cases almost hopeless until something more curative comes out.

DISCUSSION.

DR. Have you used nothing but radium?
DR. BRADFORD—No, nothing.

(2) Report of Clinical Case by DR. M. J. PAYNE, Staunton, Va.

I wish to report a case of reversed Colles' fracture. This is an unusual fracture. This subject was discussed when I presented a report of the case at the Association of the C. & O. Surgeons. It is the only case of this fracture I have seen in my experience. The injury was sustained by a young man falling from a motor cycle when it collided with an automobile. In this fracture the typical Colles' is reversed, that is, you have the gardener's spade deformity, instead of the silver-fork. The ordinary signs of fractures exist but the deformity is the reverse of the Colles.' This is a very rare fracture. It was described by Callendar in 1864 or 1865. The interesting part of the fracture is the difficulty in retaining it in proper position by the dressings usually employed for the fore-arm. I believe these fractures will be very much more common in the next few years on account of the

*Reported at the meeting of the Medical Association of the Valley of Virginia in Winchester, May 31, 1923.

wonderful increase in automobiles. The mechanism of the production of this fracture is exactly similar to that of Colles' fracture, though the resulting fracture is reversed. It comes from falling on the back of the outstretched arm, with the hand turned under. Of course, the bone first gives away on the posterior aspect.

The reduction that I found satisfactory is essentially the procedure laid down by Levis for the treatment of Colles', only the steps in reduction are reversed. It is reduced by hyperflexion, then traction, and forcible hyperextension. This is the only way reduction can be done. In the case of the young man I mentioned, the angulation was so great that I thought it would be compound, so I reduced it without X-ray, and then rayed it. I did not have it exactly right and had to repeat the manipulation. It was all right after the second effort. The difficulty experienced was in keeping the end of the radius and the head of the ulna in proper position. Ordinary flat splint will not do this. You cannot use the hyperflexed position as in Colles' fracture. I used the reversed position, the "cock-up" Jones splint, the "Crab splint," and kept the hand hyperextended in that way, and then the fracture stayed in perfect position. Remember that the ulna is the most fixed bone of the fore-arm and the radius must be fixed properly in relation to the ulna.

(3) Report of Clinical Case by Dr. WALTER Cox, Winchester, Va.

I have a most interesting case which I have had under treatment over three years: longer than any routine case of the lymphatic type. I ascribe her cure almost entirely to the use of X-ray in the hands of Dr. George Pfahler.

It is a question, however, as to whether some cases classed as lymphatic leukemia may not be merely cases showing a very great hyperleucocytosis. You get leucocytosis up to forty and fifty thousand in infectious diseases. A certain amount over this is called lymphatic leukemia.

I saw the patient the first night and made a tentative diagnosis of probable leukemia. When I made the clinical examination the next day I found a curious condition. The lymphatic nodes in the groins and neck were very much enlarged. The leucocytis was well over 100,000. The diagnosis was adopted and later confirmed. She came back from a trip and

they called me again: she was in a curious condition. There was a very great purpuric lesion over the hand and left side of the neck. I found that a woman doctor had given her a bottle of benzol. Benzol is reported as a two-edged sword. There has been facial paralysis of the left side from benzol. After this cleared up, there was a leucocytosis of 200,000. Dr. Pfahler treated her three times and sent her back with a leucocytosis of 15,000. Always as soon as she gets back to twenty or thirty thousand she goes back for treatment. She seems to be perfectly well now. The blood is now holding around 14,000. Clinically she is entirely well.

Proceedings of Societies

MEDICAL SOCIETY OF VIRGINIA

Report of Secretary-Treasurer,

Read at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16, 1923.

Net membership reported at meeting in Norfolk, 1922 ----- 1,763

<i>Gains</i>			
New members -----	64		
Reinstated -----	8		
Total -----	—	72	
<i>Losses</i>			
By death -----	22		
Resigned -----	14		
Dropped -----	22		
Total -----	—	58	
Net gain in membership -----			14
Present membership -----			1,777

FINANCIAL REPORT OF SECRETARY-TREASURER FOR 1922.

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS OF THE VIRGINIA MEDICAL MONTHLY AND MEDICAL SOCIETY OF VIRGINIA, FOR THE YEAR ENDED DECEMBER 31, 1922.

RECEIPTS.

VIRGINIA MEDICAL MONTHLY:

<i>Ordinary Revenue</i>	
Subscriptions from members -----	\$3,330.28
Subscriptions from non-members ----	257.25
Advertising -----	7,070.40
Interest on bank balances -----	49.32
	<hr/> \$10,707.25

Extraordinary Revenue.

Rent of desk space.	60.00
	<hr/> \$10,767.25

MEDICAL SOCIETY OF VIRGINIA:

Ordinary Revenue.

Membership dues	\$3,330.27
Interest on bank balances	49.33
	<u>3,379.60</u>

Extraordinary Revenue.

Rent of desk space	60.00
Magazine subscriptions	74.45
Sale of exhibit space at the Norfolk meeting of M. S. V.	248.51
	<u>382.96</u>
Net cash receipts	<u>3,762.56</u>
Net cash receipts	<u>\$14,529.81</u>

PHYSICIANS LEGAL DEFENSE FUND:

Ordinary Revenue.

Receipts for the year 1922	\$ 400.25
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CASH BALANCE:

In Merchants National Bank, Richmond, Va., January 1, 1922	\$ 1,833.76
	<u>\$16,763.82</u>

DISBURSEMENTS.

VIRGINIA MEDICAL MONTHLY:

Ordinary Expenses

Preparation of Journal	\$6,728.73
Salaries	2,033.35
Extra clerical help	21.00
Traveling expenses	2.75
Rent	126.00
Janitor's services	61.93
Light and fuel	17.19
Phone	78.25
Postage	300.00
Stationery and supplies	167.29
Miscellaneous office expenses	26.16
	<u>\$ 9,562.65</u>

Outlay

Office furniture and equipment	137.75
	<u>\$ 9,700.40</u>

MEDICAL SOCIETY OF VIRGINIA:

Ordinary Expenses

Salaries	\$3,100.00
Extra clerical help	169.50
Traveling expenses	125.79
Rent	126.00
Janitor's services	61.92
Light and fuel	17.20
Phone	66.03
Postage	322.21
Stationery and supplies	131.04
Printing programs, multigraphing letters, etc.	215.91
Miscellaneous office expenses	12.36
	<u>\$ 4,347.96</u>

Extraordinary Expenses

Expenses Legislative Committee	300.00
	<u>Outlay</u>
Office furniture and equipment	150.75
	<u>4,798.71</u>

Net cash disbursements-----\$14,499.11

CASH BALANCE:

In Merchants National Bank, Richmond, Va., December 31, 1922:	
Available for operating expenses	\$ 1,852.46
Reserved for Physicians Legal Defense Fund	412.25
	<u>\$ 2,264.71</u>

\$16,763.82

RICHMOND, VA., October 15, 1923.

I respectfully submit herewith a statement taken from the books and records of the Virginia Medical Monthly and Medical Society of Virginia, which shows in detail all cash receipts and disbursements from January 1, 1922, to December 31, 1922, inclusive.

I have examined the books and records and verified the cash balances in bank, both at the beginning and end of the year, and I hereby certify that all facts shown in the above statement are true and correct to the best of my knowledge and belief.

L. B. EDWARDS.

STATE OF VIRGINIA,

CITY OF RICHMOND, TO-WIT:

This day personally appeared before me, John Maurice Miller, a Notary Public, in and for the City, in the State aforesaid, L. B. Edwards, who by me being duly sworn according to law, deposes and says that the facts set forth in the above statement are true and correct to the best of his knowledge and belief, and acknowledges the signature attached thereto to be his own.

Subscribed and sworn to before me this 15th day of October, 1923.

My commission expires February 12, 1925.

JOHN MAURICE MILLER,
Notary Public.

Report of the Delegates from Virginia to the American Medical Association Meeting.

The beautiful city of the Golden Gate, together with the entire state of California, united to welcome the seventy-fourth Annual Session of the American Medical Association in the most elaborate and whole-souled fashion.

To begin with, each visitor was presented on arrival with a handsome souvenir book of welcome, containing 222 pages, gotten up in the most elegant style, and entitled "Medical California." On its cover page, decorated with a giant tree and an ancient convent, is the inscription "California Welcomes the A. M. A."

A brief description could not possibly do justice to the publication, which is filled with engravings of the beautiful places of the state, and a description of the various hospitals and colleges, together with local and state Medical Societies. The most minute directions are given in regard to meetings, entertainments, public places and clinics.

The State Society meeting occurred immediately preceding the A. M. A., and several other National Societies held their annual gatherings. All are detailed in the book.

Elaborate clinics and entertainments for the visiting profession were held at Los Angeles, San Francisco, Santa Barbara, San Diego and other points, preceding and following the national gathering.

Large numbers of visiting doctors and their families traveled on special trains, which combined with the trip to San Francisco a sight-seeing tour covering much of the western section.

The hospitality of the profession and laity of San Francisco, and the entire state of California, was lavish and delightful. Never has the Society been more beautifully entertained.

The various meetings, both business and professional, were well attended and inspiring.

Speaker Warnhuis, of the House of Delegates, the retiring President, Dr. DeSchweinitz, and the incoming President, Dr. Wilbur, each of them in his official report, laid great stress on the effectiveness and thoroughness of the productive work being performed by the A. M. A., not only for the cause of organized medicine and the profession at large, but also for the good of the country and humanity. They gave full credit to Dr. Simmons and his splendid corps of assistants.

The death of Dr. Craig, for eleven years the untiring and devoted Secretary of the Association, was noted by all with deepest sorrow, and with expressions of the warmest affection for his memory. His successor, Dr. Olin West, from Tennessee, has already proven his adaptability and fitness for the position, and endeared himself to the membership by his affable manners and deep interest in the work.

The finances of the organization are in such good condition that, notwithstanding the heavy cost attendant upon the erection of a large addition to the home building, the Board of Trustees will probably be able shortly to announce a reduction in fellowship dues.

Since the last session a Bureau of Legal Medicine and Legislation has been established, with Dr. Woodward, formerly Health Commissioner of the District of Columbia, at its head, and has already accomplished effective results, especially in connection with the Prohibition Act and Narcotic Law, bringing about a better understanding between the Government and the profession, and protecting the profession in any infringement of its rights and customs.

In the future, proposed changes in these laws will be properly submitted to the Bureau of the A. M. A. before adoption.

Protest against the training of veterans in chiropractic have been so successful that assurance has been given by Gen. Hines that no future contracts will be made for such training.

The new journal "Hygeia," published by the A. M. A., for the benefit of the public, has been received with tremendous favor and already accomplished great good for the profession. It is earnestly desired that the members of this Society take every possible step to encourage its wide distribution in Virginia, by making it available for their patients, and by urging subscriptions on the various social and welfare organizations.

The Council on Health and Public Instruction laid further stress on the advisability of the local societies urging upon the public the necessity for periodical health examinations and proposes shortly to publish in the Journal a blank form for such procedures.

The Council on Medical Education and Hospitals

reported a reduction in the number of medical colleges from 83 to 81, making the present number just half of what it was in 1906. There has been a gradual increase in the number of medical students with marked improvement in curriculum and teaching facilities.

In reference to the problems of Medical Practice, the Council considers that the modern training of general practitioners is a matter which will have to be given more consideration; that from eighty per cent to ninety per cent of all cases of illness can properly be cared for by well qualified and resourceful general practitioners; and that the need for specialists should not be over emphasized, the trouble at the present time being that many physicians are posing as specialists without having first obtained the essential training.

The problem of the scarcity of physicians in the rural sections is again given full consideration, the principal suggestions being as follows:

"It is believed that any community that can support a physician can get one if its citizens are willing to pledge themselves to guarantee an income of from \$2,500 to \$3,000 a year and to interest the community in the physician's support. This plan has worked out satisfactorily in a Middle West community where the physician selected secured from his practice an income larger than the amount pledged, so that the guarantors have not been called on to pay out any money."

The Council gave considerable attention to Group Clinics with the following conclusions:

"Group medicine is a type of practice which, if properly organized and conducted, will afford efficient service to the fifteen or twenty per cent of the sick and injured who may require special treatment. However, there is an opportunity afforded the groups efficiently to aid the general practitioner in consultations, and in the diagnosis and treatment of his patients. The attitude of the group in its relations to the general practitioner should be characterized by the same fundamental principles and standards of ethics that apply to the individual physician who is called into consultation by the general practitioner.

"Some of the larger and properly conducted group clinics are also providing graduate instruction both in general practice and in the specialties. Groups that develop research work and furnish a high quality of treatment can add materially to their service to the profession by providing residencies for those who seek to develop proficiency in the various specialties."

Referring to the problem of Nurse Training, the Council feels that such training should be improved and standardized; arranged for the appointment of a general committee to handle the situation, and suggested that the length of the course be reduced to twenty-eight months.

The Council called attention to the inadequacy of post-graduate medical schools and suggested additions and improvements.

Dr. Pusey, of Chicago, was elected President, and that city named for the 1924 meeting.

The Woman's Auxiliary held very large and enthusiastic sessions and planned to extend their branch organizations into every state and important local section. Virginia was honored by having two of its delegates named as officers.

In the A. M. A., Virginia, although represented by a very small attendance of fellows, was further honored with the Chairmanship of the Council on Scientific Assembly and the Chairmanship of the Reference Committee on Miscellaneous Business.

Your delegates would urgently suggest that, if pos-

sible, steps be taken by the State Society so as to insure a full representation in the House of Delegates. On more than one occasion the absence of one or more delegates has caused considerable inconvenience and trouble.

In conclusion, your delegates would urge that the State Association be brought in as close contact as possible with the national body by more effective organizations, by the attendance on the national meetings of the Secretary and other officers of the State Society, and by a larger attendance of the fellows and a wider participation in the affairs of the American Medical Association.

Respectfully submitted,

SOUTHGATE LEIGH, *Delegate*,
J. ALLISON HODGES, *Alternate*.

Meeting of Executive Council,

At Westmoreland Club, Richmond, April 27, 1923.

Present: Drs. R. L. Williams, Chairman, L. T. Price, Garnett Nelson, D. H. Mason and R. L. Page.

Absent: Drs. M. J. Payne, H. A. Burke, W. W. Wilkinson, Isaac Peirce, G. W. McAllister, T. G. Hardy, H. B. Spencer, Hugh McGuire, F. H. Smith and P. E. Tucker.

Quorum for the transaction of the business before the Council found present, and meeting was called to order by the chairman.

Motion by Dr. Page, seconded by Dr. Nelson, that the date for the annual meeting of the Society be fixed as October 16th to 19th, inclusive. Unanimously adopted.

Report of the program committee was read to the council.

Motion by Dr. Mason, seconded by Dr. Page, that the recommendations of the program committee be adopted. Unanimously approved.

Motion by Dr. Nelson, seconded by Dr. Mason: That the Medical Society of Virginia reimburse those members of the Executive Council living outside of Richmond, for actual expenses incurred in attending called meetings of the Council in Richmond. Unanimously approved.

Motion by Dr. Price, seconded by Dr. Nelson: That, in the event an Academy of Science or similar organization establish a suitable home for professional organizations in Richmond, the headquarters of the Medical Society of Virginia be established in that building, provided rental cost does not exceed fifty dollars per month. Unanimously adopted.

There being no further business before the Council, a motion to adjourn was adopted unanimously.

The House of Delegates

Met Wednesday morning, October 17th, at nine o'clock, Hotel Roanoke, Roanoke, Virginia, the President, Dr. J. Staige Davis, presiding.

Quorum found present and meeting called to order by chairman.

The report of the Secretary-Treasurer of the society was presented and by unanimous vote was accepted.

At this meeting matters of general interest and pertaining to the welfare of the organization, the practice of medicine generally and the public health, were discussed.

Reports covering the activities of the State Board of Medical Examiners in prosecuting violators of the Medical Practice Act were made, followed by discussion by several members present.

Motion duly made and seconded that the president appoint a committee to consider the problem of the quacks and to draw up suitable resolutions

which should cover the position of the regular practitioners with reference to violators of this law. Unanimously adopted. The president appointed the following: Drs. J. Allison Hodges, A. L. Gray, J. W. Preston, F. H. Smith, P. St. L. Moncure, I. C. Harrison, and Isaac Peirce.

Meeting adjourned.

The Executive Council

Met October 17, 1923, at Hotel Roanoke, Roanoke Va.

Roll call and all found present. Meeting called to order by the chairman, Dr. R. L. Williams.

Minutes of last meeting read and approved.

Dr. J. Allison Hodges was given the privilege of the floor and offered the following resolutions providing for the creation of a Public Health League in Virginia.

RESOLUTIONS PRESENTED TO THE MEDICAL SOCIETY OF VIRGINIA FOR THE ESTABLISHMENT AND ORGANIZATION OF A PUBLIC HEALTH LEAGUE FOR THE STATE OF VIRGINIA.

In view of the fact that the science of medicine today seeks to improve and effect not only the treatment and cure of disease, but also its prevention and conservation, therefore, to that end, in order that the Medical Society of Virginia may enlarge the scope of its professional activities and civic usefulness, be it

Resolved, 1. That the Medical Society of Virginia endorses the formation of a State Public Health League, which shall have authority to formulate its own government, except as hereafter provided, and whose aim and purpose shall be to study and solve, if possible, the economic, educational, legislative and public health problems of organized medicine, and whose membership shall consist of all regular practising physicians in the State, the members of the Woman's Auxiliary to the Medical Society of Virginia, and such other persons, as shall join the organization;

2. That, until changed by either or both organizations, the President of the Public Health League shall be nominated by the House of Delegates and elected biennially by the Medical Society of Virginia for a term of two years' service;

3. That the other officers of the Public Health League shall be appointed for a similar term of service by the President of the Medical Society and its Executive Council, and the President of the League, and its executive committee, except that for the present term of office of one year, that all necessary officers required for the establishment of the League, shall be appointed within one month after the date of passage of these resolutions by the in-coming President of the Medical Society of Virginia;

4. That all members of the Medical Society of Virginia in good standing shall automatically become members of the Virginia Public Health League, without further cost, except the initiation fee of one dollar, when they enroll their names as members of any district, county or city branch organization of the League;

5. That a "contact" committee, which shall also constitute the Executive Staff Officers of the League, representing the Medical Society and the League, and composed of the President and Secretary of the Medical Society of Virginia, the President and Chairman of the Executive Committee of the Public Health League, and the Executive Secretary of the League, who shall be a layman, and who would be the executive secretary of this committee, shall ap-

point the chairmen for the various committees needed, these chairmen being empowered to appoint the members of their own committees, with the approval of the executive staff officers above-mentioned;

6. The committees for the present, shall consist of the following:

Committees on Cancer, Tuberculosis, Health Instruction and Public School Education, Social and Mental Hygiene, Legislation and Industrial Relations, County Sanitation and Institutional Reforms, Hospital Survey and Standardization, Pre-Natal Care and Child Welfare, and Conservation of Vision, and School Children's Health, and these committees shall co-ordinate their work as far as possible with like committees of this Society, the A. M. A., the State, City and National Government, or other accredited bureaus or organizations;

7. That the chairmen of these committees, together with the executive staff officers named, shall meet once every six months, or as may later be determined, in one of the cities in the state to discuss what has been accomplished, and to consider the plans for future work;

8. That a summarized report of the work accomplished annually, shall be presented each year through the executive officers of the League at the annual meeting of the Medical Society of Virginia;

9. That at some designated city in the state, at such times as may be deemed advisable by the Executive Staff Officers, a Health Exposition for the education of the public, shall be held, at which a display of the progress of Medicine and its accomplishments shall be made;

10. That in furtherance of the above recommendations, if deemed feasible and advisable by the Executive Staff Officers, a Health Exposition shall be held during 1924 in the city of Richmond.

These resolutions received the unanimous endorsement of the Executive Council.

Dr. Clarence Porter Jones offered the following resolution:

Resolved, That the Medical Society of Virginia endorse the Lye Legislation Program of the American Medical Association, for a proper POISON label to be placed on lye and similar products offered for sale, and

That the Legislative Committee give every assistance to the Hon. E. W. Milstead, of Newport News, a member of the Legislature, who has volunteered to sponsor a bill identical or similar to the Lye Legislation Committee's bill of the American Medical Association, which is now a law in Florida and Pennsylvania.

This resolution received the unanimous endorsement of the Executive Council.

Dr. Jones also introduced the following resolution (a similar one having been offered by Drs. Greer Baughman and Garnett Nelson, of Richmond):

The Walter Reed Medical Society of Virginia, in session at Yorktown, October 10th, 1923, unanimously voted to submit the following to the Medical Society of Virginia:

Whereas, Dr. Walter Reed, born and reared in Virginia, after distinguishing himself in the defence of his country and making many discoveries in medicine, finally gave his life for science and is regarded as one of the heroes of medicine;

Be it Resolved, That the Medical Society of Virginia undertakes with a deep sense of gratitude to preserve the memory of this great Virginian, by a

suitable memorial at the University of Virginia and by marking his birth place in Gloucester County, and his boyhood home in Harrisonburg, with tablets, so that his career may be an incentive to each generation.

That a committee of five shall be appointed by the President of the Medical Society of Virginia for the purpose of formulating plans, preparing suitable inscriptions, soliciting funds, and arranging a suitable ceremony for the unveiling of these tablets.

That the Medical Society of Virginia pledge as the first contribution one hundred dollars to this fund.

CLARENCE PORTER JONES,

LONDON E. STUBBS,

HARRY A. TABB.

This resolution received the unanimous endorsement of the Executive Council.

The following nominations were made for the consideration of the House of Delegates and the Society: For President, Dr. W. W. Chaffin, Pulaski; First Vice-President, Dr. Hunter H. McGuire, Winchester; Second Vice-President, Dr. R. B. James, Danville; Third Vice-President, Dr. O. T. Amory, Newport News; Secretary-Treasurer and Business Manager, Agnes V. Edwards, her salary being fixed at \$3,000.00. She is authorized to employ an office assistant at a compensation not to exceed \$800.00 annually. The term of office of the Secretary-Treasurer is to begin January 1st, 1924, while the term of office of the incumbent, G. H. Winfrey (resigned), is to terminate December 31, 1923.

Nominations for the House of Delegates of the American Medical Association: Dr. J. Allison Hodges, Richmond; Alternate, Dr. R. C. Bryan, Richmond; Dr. Southgate Leigh, Norfolk; Alternate, Dr. E. C. S. Taliaferro, Norfolk. The terms of the above named delegates to expire in 1925. Alternate for Dr. Jos. T. Buxton (whose term as delegate expires in 1924), Dr. J. Staige Davis, University.

The following standing committees were nominated:

Auditing—Dr. Paul W. Howle, Dr. Garnett Nelson.

Automobile Insurance—Dr. A. L. Gray, Dr. M. W. Peyser, Dr. Paul W. Howle.

Hospitals—Dr. S. S. Gale, Dr. J. S. Horsley, Dr. Southgate Leigh, Dr. A. M. Willis, Dr. S. H. Watts.

Judiciary—Dr. W. F. Drewry, Dr. Virginius Harrison, Dr. Hugh Nelson, Dr. Frank Hancock, Dr. Bernard Kyle, Dr. J. A. Owen, Dr. J. L. Early.

Legislative—Dr. H. U. Stephenson, Dr. J. Bolling Jones, Dr. C. H. Rolston, Dr. T. S. Hening, Dr. J. W. Preston, Dr. P. E. Tucker, Dr. J. W. Hope, Dr. S. W. Maphis, Dr. G. A. Stover, Dr. Israel Brown and Dr. C. B. Bowyer.

Library—Dr. I. C. Harrison, Dr. Stuart McGuire, Dr. Southgate Leigh, Dr. Isaac Peirce and Dr. R. J. Payne.

Committee on Co-operation with State Department of Health in its Child Hygiene Work—Dr. Ben Rosebro, Dr. Mary E. Brydon, Dr. L. T. Royster, Dr. J. S. Davis and Dr. G. A. Stover.

Committee on Co-operation with State Nurses' Association—Dr. J. A. Hodges, Dr. A. M. Willis, Dr. R. C. Fravel, Dr. Joseph T. Buxton, Dr. C. J. Andrews, Dr. E. Barksdale, and Dr. J. C. Flippin.

Membership—Dr. J. A. White, Dr. Geo. J. Williams, Dr. J. E. Knight, Dr. F. H. Smith and Dr. C. E. Conrad.

Publication—Dr. A. G. Brown, Dr. A. L. Gray, Dr. B. R. Tucker, Dr. Paul Howle, Dr. E. L. Kendig.

Necrological—Dr. C. M. Edwards, Dr. S. T. A. Kent and Dr. T. J. Sims.

Cancer—Dr. R. C. Bryan, Dr. J. S. Horsley, Dr. J.

Bolling Jones, Dr. I. C. Harrison, Dr. C. R. Grandy, Dr. J. T. Buxton, Dr. P. W. Boyd, Dr. M. J. Payne, Dr. D. P. Peters, Dr. Hugh Trout, Dr. F. H. Smith, Dr. S. B. Moore and Dr. S. H. Watts.

Public Health and Education—Dr. R. K. Flanagan, Dr. James Morrison, Dr. C. B. Bowyer, Dr. W. S. Keister and Dr. J. H. Hiden.

Transportation—Dr. J. B. DeShazo, Ridgeway, Va.

A petition from the Russell County Medical Society, requesting a charter from the Medical Society of Virginia, was presented and granted by a unanimous vote. The secretary of the Council was instructed to draft a letter to be sent to the officers of this society recommending that this county society join with other counties in that part of Virginia in organizing a district society.

Council adjourned.

The House of Delegates

Held a meeting Thursday morning, October 18th, at Hotel Roanoke.

Roll call dispensed with by unanimous vote as soon as a quorum was found present.

Report of the Executive Council was presented and unanimously approved.

The committee appointed to draft suitable instructions to the Legislative Committee of the Society covering attitude of the Society regarding the enforcement of the Medical Practice Act, reported as follows: That the legislative committee of the Medical Society of Virginia, in conjunction with the State Board of Medical Examiners, be instructed to examine the medical practice laws of other states and to draw up a model bill to be presented for the revision of our present medical practice act, if, in the judgment of our legislative committee, such a revision is deemed wise. That the legislative committee be instructed that, in the proposed revision of our medical practice act the educational requirements, both preliminary and professional, should be fully safeguarded whether or not the revised medical practice act is presented to the General Assembly.

This report was unanimously adopted.

Report from the Library Committee was presented: This committee recommends that the Medical Society of Virginia enlarge the library now owned by the state organization, which is in the office of the Society in Richmond, this enlargement to be accomplished by the voluntary gift of books and money to the society and that we secure from our members ten thousand dollars to make the library an effective agency for raising and maintaining our scientific and professional standards.

This report was unanimously adopted.

Motion, duly seconded, that in future all money received from commercial exhibits be given to the local society entertaining the state organization. Unanimously adopted.

Motion, duly seconded, that the Medical Society of Virginia accept the invitation received from the Augusta County Medical Society and other organizations in the Valley, to hold its next meeting in Staunton. Unanimously adopted.

The following nominations were made by the House of Delegates: To be members of the Executive Council from the State-at-Large: Drs. H. H. Trout, of Roanoke, and W. B. Martin, of Norfolk. From the First Congressional District: Dr. C. P. Jones, of Newport News; from the Third Congressional District, Dr. A. L. Gray, of Richmond; from the Tenth Congressional District, Dr. P. K. Graybill, of Fincastle.

A vote of thanks was extended Dr. J. B. DeShazo for his services in securing a reduction in railroad rates to Roanoke for members of the Society.

A vote of thanks was extended the retiring secretary, G. H. Winfrey, for the satisfactory and efficient services rendered the Society during his connection with the organization.

Meeting adjourned.

These proceedings of the Executive Council and House of Delegates having been considered by the Medical Society of Virginia, Thursday, October 18th, were unanimously approved.

Immediately following the adjournment of the Society the Executive Council was called and the following officers were chosen: Dr. R. L. Williams, Chairman; Dr. L. T. Price, Clerk.

Adjourned.

At the last meeting of the Society, a rising vote of thanks was tendered the Roanoke Academy of Medicine and people of Roanoke for the splendid entertainment provided for the Society.

Norfolk County Medical Society.

At the regular monthly business meeting on October 1st, 1923, the President, Dr. Chas. W. Doughtie, appointed the following standing Committees for the year 1923-24:

Surgery and Gynecology—Drs. C. Carroll Smith, *Chairman*, N. F. Rodman, E. T. Hargrave, C. J. Devine, G. R. Berkeley.

Medicine and Public Health—Drs. R. U. Burges, *Chairman*, J. A. Strickland, H. M. Doles, W. B. Newcomb, F. C. Rinker, M. J. Doyle.

Obstetrics—Drs. Geo. W. Schenck, *Chairman*, Burnley Lankford, C. J. Andrews.

Children—Drs. Franklin D. Wilson, *Chairman*, W. P. McDowell, W. Spigel.

Eye, Ear, Nose and Throat—Drs. H. R. Etheridge, *Chairman*, A. D. Morgan, J. Warren White, Jos. Hume, E. A. Land.

Membership—Drs. Southgate Leigh, *Chairman*, G. B. Gilmore, J. D. Stroud.

Ethics—Drs. E. C. S. Taliaferro, *Chairman*; C. R. Grandy, H. S. Baker, R. L. Williams, H. R. Drewry.

Finance—Drs. D. Lee Hirschler, *Chairman*, S. G. Gill, S. H. Graves.

Library—Drs. Frank Hancock, *Chairman*, W. B. Martin, J. L. Rawls.

Hospitals—Drs. J. H. Culpepper, *Chairman*, I. Brown, W. B. Newcomb, L. Berlin, R. L. Corbell, J. D. Collins.

Nursing—Drs. Lomax Gwathmey, *Chairman*, Foy Vann, B. A. Doggett, W. L. Harris, M. N. King.

Among the matters of interest which came up at this meeting was the announcement from

the Woman's Auxiliary of the Norfolk County Medical Society of the organization of that body and the expression of a willingness to aid the Society in any way possible. Mrs. R. L. Payne, Sr., is the President.

In recognition of his long and faithful service to the Society, Dr. Lawrence T. Royster was elected to Honorary Membership for life, and tendered a dinner on the eve of his removal to take up the duties of Professor of Pediatrics in the University of Virginia.

Election of delegates to the House of Delegates of the Medical Society of Virginia resulted in the choice of Drs. E. C. S. Taliaferro, P. St. L. Moncure, J. L. Rawls, J. D. Collins and A. A. Burke.

LOCKBURN B. SCOTT,
Secretary.

At the meeting of the Surgical Section on October 8th, Dr. Foy Vann read a paper on "Osteomyelitis," and Dr. L. F. Magruder one on "Limitations of the X-Ray in Diagnosis of Osteomyelitis." Abstracts of these papers are given herewith:

Osteomyelitis.

Dr. Vann stated that ancient evidences of the destructive effects of osteomyelitis may be found in the Medical Museums, while the modern evidences are to be found among the plates on file in X-ray laboratories. The crippling results of the disease may be found among the procession to orthopaedic clinics. Treatment has not exactly kept pace with our understanding of the disease.

The etiological organism is usually of the staphylococcus group, less frequently of the streptococcus, occasionally a typhoid. Colon bacillus and pneumococcus have been found. Bone destruction is less extensive in the three latter.

The infection is blood-borne and, after having been established, shows a predilection for bone tissue.

The age incidence is that of youth and trauma may have bearing on the immediate outset. While no bone is exempt, the femur and tibia lead the procession.

The mention of four stages describes the pathology:

1. Acute stage, stage of infection, suppuration and general intoxication.

2. Sub-acute stage, stage which begins when drainage has been established, with the cessation of toxic symptoms.

3. Chronic stage, formation of sequestra, involucrum and sinuses.

4. Chronic stage of localized bone abscess.

The symptoms are the same as the outset of any acute infectious disease. Pain and temperature are out of proportion to the objective symptoms. If the outset is abrupt and there is added prostration and pain in an extremity, osteomyelitis should be strongly suspected. Have in mind syphilis, typhoid fever, acute bursitis of the shoulder (if the humerus is painful), sub-periosteal fracture of epiphyseal separation, scurvy, tuberculous knee (if the tibia is painful and the physician is called at night), traumatic periostitis, cellulitis (erysipelas), acute arthritis. A history, temperature and examination of the blood eliminates all except the last two. The skin manifestation of erysipelas is usually convincing, especially if it has hurdled by a joint. Pain and spasm on passive movement are characteristic of an acute joint. A co-existing bone and joint infection is doubtful.

Treatment of the acute stage should be prompt, decisive, preferably after the manner in which the dentists drill into a tooth socket and release tension. Such treatment renders the questions of dressing and after-treatment unimportant. The treatment is wholly surgical, but the responsibility for an early diagnosis and early application of the treatment rests with the physician. X-ray is of value in the diagnosis in all stages except the first. Treatment of the sub-acute stage should be conservative, expectant in the chronic, plastic in the stage of localized bone abscess. Curette is not employed except in the late sinus and bone abscess, and even here not blindly on account of the difficulty in distinguishing between infected and vascular and sclerosed bone. The radical operation has been wisely abandoned.

Eradication of a bone sinus is a distinct problem. The difficulty increases when near to a joint or in a poorly covered bone. For this purpose a soft tissue transplant is more effective than any heretofore tried methods, and a pedicled muscle transplant seems best. Chemical sterilization has been tried and its efficiency established. This is more dependent on the surgical technique than any particular chemical employed.

It is difficult to know when a chronic osteomyelitis is cured.

Limitations of the X-Ray in Diagnosis of Osteomyelitis.

Dr. L. F. Magruder, in his paper on the above subject, said that chronic osteomyelitis is in reality a bone sclerosis. The X-ray findings in these cases are fairly typical and helpful as a guide to the surgeon. The striking and predominant finding is extensive new bone formation with but little bone destruction. The normal relation of cortex to medulla is lost. There may be islands of lessened density and less frequently sequestra.

Acute osteomyelitis might better be called myelitis osteitis as the myelitis precedes by several days the osteitis. During the early stages of acute osteomyelitis the infection extends along the lines of least resistance. The entire medulla may be destroyed before the cortex is involved through the Haversian canals. Before there is breaking down of the cortical bone substance, the X-ray is of no value in diagnosis. In cases where early drainage is not established the destructive process extends to the cortex through the Haversian canals, giving rise to sequestra which will vary in size and shape, depending upon the location of the Haversian canals involved.

One of the most dangerous laboratory reports is a negative X-ray finding during the early stages of an acute osteomyelitis.

In cases where acute osteomyelitis is suspected, the surgeon is justified in drilling through the cortex for diagnosis just as much as he is justified in doing a spinal puncture or aspirating the pleural cavity. By so doing he may not only establish a tentative diagnosis but may conserve a member.

The meeting of the Medical Section on October 15th was called to order by the Section Chairman, Dr. R. U. Burges.

Dr. Martin presented a paper outlining the Value of Insulin in the Treatment of Diabetes. The anatomy and physiology of the islands of Langerhans were briefly reviewed. Charts were shown demonstrating the effects of insulin in lowering the blood sugar in man, and a case of diabetic coma complicated by infection that was treated with insulin and recovered was reported.

Dr. Fitchett discussed the Dietetic Treatment of Diabetes, Both With and Without Insulin as an Adjunct. He emphasized the im-

portance of properly balanced diet and of preserving a correct carbohydrate-fat ratio.

The Walter Reed Medical Society

Held its autumn session in Yorktown, Va., October 10 and 11, under the presidency of Col. L. A. Thompson, of National Soldiers' Home, Va., Dr. L. E. Stubbs, Newport News, was at the secretary's desk. The attendance was large, the papers excellent, and altogether this was one of the best meetings of the Society. There were several distinguished visitors from out of the State and other sections of Virginia. The social features were also most enjoyable. On the first day dinner was served the visitors by the ladies of Yorktown, and on the second day an oyster roast was tendered them by the First National Bank of Yorktown.

The next meeting will be held in May 1924, the time and place to be decided upon later.

The Patrick-Henry Medical Society

Held its regular meeting October 5th, at Stuart, Va. Dr. R. R. Lee, of Martinsville, read a paper on "Pulmonary Tuberculosis: Diagnosis and Treatment," and Dr. J. A. Shackelford, of Martinsville, presented a paper on "Tuberculosis of the Hip Joint and Sacro-Iliac Strain."

The officers elected for the present year are as follows: President, Dr. J. A. Shackelford, Martinsville; Vice-President, Dr. G. T. Divers, Stuart; Secretary-Treasurer, Dr. G. B. Dudley, Jr., Martinsville. This society meets every other month and the next meeting will be held at Martinsville, December 7, 1923.

The Roanoke Academy of Medicine,

At its regular meeting held October 1, elected Dr. H. B. Stone president; Dr. S. Beverly Cary vice-president; and Dr. M. A. Johnson secretary-treasurer. All of the above are of Roanoke.

Warren-Rappahannock-Page Medical Society.

Dr. Giles B. Cooke, Front Royal, Va., and Dr. L. C. Haynes, Flint Hill, Va., are at this time president and secretary, respectively, of this Society.

The Medical Association of The Valley of Virginia

Held its last regular meeting in Staunton, September 27, Dr. Hunter H. McGuire, Winchester, presiding. The meeting was a most interesting one. During the morning session,

papers were read by Dr. R. P. Bell, Staunton, Dr. J. H. Deyerle, Harrisonburg, and Dr. J. M. Emmett, Clifton Forge. In the absence of Dr. H. I. Pifer, Winchester, Dr. Charles E. Conrad, Harrisonburg, gave a brief talk on the subject which Dr. Pifer had selected—Treatment of Infantile Diarrhea. After lunch, the program was resumed and papers were read by Dr. J. E. Harris, Winchester, Dr. G. S. Hartley, Clifton Forge, Dr. Grant Preston, Harrisonburg, and Dr. M. J. Payne, Staunton. All papers were freely discussed.

This Association voted to join with the Augusta County Medical Association in inviting the Medical Society of Virginia to meet in Staunton in 1924.

Officers elected for the ensuing years are: President, Dr. J. M. Emmett, Clifton Forge; Vice-Presidents, Drs. D. M. Kipps, Front Royal, A. L. Tynes, Staunton, and B. P. Dutton, Winchester; Secretary, Dr. A. F. Robertson, Staunton; Treasurer, Dr. J. M. Biedler, Harrisonburg; delegate to the Roanoke meeting of the Medical Society of Virginia, Dr. F. M. Leech, Lexington.

The next meeting is to be held in Harrisonburg in the Spring of 1924.

Book Announcements

Dreads and Besetting Fears. Including States of Anxiety, Their Causes and Cure. By TOM. A. WILLIAMS, M. B., C. M., Neurologist to Freedman's Hospital, Washington, Boston, Little, Brown and Company. 1923. Mind and Health Series. 12 mo. Cloth. 217 pages. Price, \$1.75, at book-sellers.

This book is the work of a widely-known psychiatrist of Washington, D. C. So noted a writer as H. Addington Bruce says of him: "Few other specialists in this country have had so varied a practice as he in the management of fear states." His book shows extremely wide reading, both with respect to scientific matter as well as general literature. He explains the phenomena of fear, and traces its psychic mechanism, revealing unsuspected sources and causes all unknown. He decries the preponderating importance attached to the sexual sphere by a certain school of psychologists, "Women are not more chaste than men," he says, "but dread social disapproval more." He shows the intimate relation often

existing between the physical and the mental, especially when the psychical is out of balance. "Timidity does not connote mental inferiority." "Anxiety is merely chronic fear." "A terrier hunting a rat is under great tension, but he is not timid." His illustrations are exceedingly apt; they are many times taken from his case records, and the ultimate outcome showed that he placed an unerring finger on obscure causes.

He also points out the grievous errors unwittingly made by those in charge of young children, who implant in them oftentimes the seed of fear which later springs up with disastrous consequence. His accounts of methods of dealing with certain types, in order to relieve them, is full of value. He takes issue with certain theories as to the part heredity plays, attributing greater weight to environment. "Just as Pawlow conditioned and re-conditioned the responses of his dogs, so are we able to induce fear and to dispel fear in human beings. It is more difficult because human mentality is more complex, but the skill exists in many who have acquired mastery of psycho-pathology."

He sketches the advantages and the disadvantages of fear. "Fear is the mother of prudence, * * fear is the foundation of respect for others." "The fascination of some women for men of sinister repute is in part due to their fear"; the *motif* in "Trilby" and in "Elsie Venner" by Oliver Wendell Holmes. "Fear is the first of the four natural limitations which must be transcended if true nobility is to be achieved, is declared in "The Research Magnificent," by H. G. Wells.

To some it may seem as if in certain passages the author is very technical, but he is exceedingly accurate in his choice of words.

As to the remedy for fear, it may be summed up in a few words—substitute some other emotion. Just how this may be done is the function and office of the psychiatrist to show. Not every case is alike, and as diverse as are the causes, so manifold are the phases of treatment. The author, however, stresses the futility of the patient saying "I am not afraid." a mere negation of the fear instinct—which is simply all the time calling his own attention to its existence.

E. P. TOMPKINS, M. D.

Obstetrics for Nurses. By CHARLES B. REED, M. D., Obstetrician to Wesley Memorial Hospital, Chicago. St. Louis. C. V. Mosby Company. 1923. 12 mo. 399 pages, with 144 illustrations including two color plates. Cloth. Price \$3.50.

Principles of Bacteriology. By ARTHUR A. EISENBERG, A. B., M. D., Director of Laboratories, St. John's Hospital; Pathologist to Lakewood Hospital; Serologist to St. Ann's Hospital, Cleveland, Ohio, etc. Second Edition. St. Louis. C. V. Mosby Company. 1923. 12 mo. 214 pages. Cloth Price \$2.25.

Pediatrics. By Various Authors. Edited by ISAAC A. ABT, M. D., Professor of Diseases of Children, Northwestern University Medical School, Chicago. In eight octavo volumes, totaling 8,000 pages, with 1,500 illustrations, and separate Desk Index volume free. Now ready, VOLUME I, containing 1,240 pages with 284 illustrations, and VOLUME II, containing 1,025 pages with 180 illustrations. Philadelphia and London. W. B. Saunders Company. 1923. Cloth, \$10.00 per volume. Sold by subscription.

Habitual Constipation. Its Causes, Consequences, Prevention, and Rational Treatment. Set forth in non-technical language. By ISMAR BOAS, M. D., professor of Medicine in Berlin. Translated by THOMAS L. STEDMAN, M. D., formerly editor of the Medical Record. Funk and Wagnalls Company. New York and London. 1923. 12mo. 299 pages. Cloth, \$2.00 net.

International Clinics. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles on all branches of Medicine and Surgery. By leading members of the medical profession throughout the world. Edited by HENRY W. CATTELL, A. M., M. D., Philadelphia, and Collaborators. Volume III. Thirty-third Series. 1923. Philadelphia and London. J. B. Lippincott Company. 1923. 8vo. 312 pages. Cloth.

A Manual of the Practice of Medicine. Prepared Especially for Students. By A. A. STEVENS, A. M., M. D., Professor of Applied Therapeutics in the University of Pennsylvania. Eleventh Edition. Entirely Reset. Philadelphia and London. W. B. Saunders Company. 1923. 12mo. 645 pages, illustrated. Cloth, \$3.50 net.

Gynecology. By WILLIAM P. GRAVES, A. B., M. D., F. A. C. S., Professor of Gynecology at Harvard Medical School. Third Edition, Thoroughly Revised. Philadelphia and London. W. B. Saunders Company. 1923. 8vo of 936 pages with 388 half-tone and pen drawings and 146 microscopic drawings, 103 of the illustrations in colors. Cloth, \$9.00 net.

Introduction to Medical Biometry and Statistics. By RAYMOND PEARL, Ph.D., Professor of Biometry and Vital Statistics, John Hopkins University. Philadelphia and London. W. B. Saunders Company. 1923. 8vo. of 379 pages, illustrated. Cloth, \$5.00 net.

The Examination of Patients. By NELLIS B. FOSTER, M. D., Associate Physician to the New

York Hospital; Associate Professor of Medicine at Cornell University, College of Medicine. Philadelphia and London. W. B. Saunders Company. 1923. 8vo. of 253 pages, illustrated. Cloth, \$3.50 net.

A Text-Book of Anatomy and Physiology. For Schools of Nursing, Normal Schools and Colleges. By JESSE FEIRING WILLIAMS, M. D., Professor of Physical Education, Teachers College, Columbia University, New York City. Philadelphia and London. W. B. Saunders Company. 1923. 12mo. of 523 pages; 369 illustrations, 25 of them in colors. Cloth, \$3.00 net.

Rubber and Gutta Percha Injections. Subcutaneous Injections of Rubber and Gutta Percha for Raising the Depressed Nasal Bridge and Altering External Contours. By CHARLES CONRAD MILLER, M. D. Chicago. 1923. Oak Printing and Publishing Company. 12 mo. 99 pages. Cloth, \$1.75 prepaid.

The U. S. Civil Service Commission

Announces open competitive examination for trained nurse and trained nurse (psychiatric), to be held throughout the country on December 5, for male and female nurses. If interested, secure full information and application blanks from the Commission, at Washington, D. C.

Camp Sevier Veterans' Hospital to be Closed.

The hospital for disabled veterans, located at Camp Sevier, is to be closed and all patients will be transferred to U. S. Veterans' Hospital at Oteen, N. C., at which it was reported there were approximately 300 vacant beds.

Ancon Hospital Damaged.

A heavy rainfall, early in October, caused a landslide at Ancon Hill, which did considerable damage to the Ancon Hospital buildings. The isolation ward was buried under tons of earth, but none of the patients was injured. No damage was reported to Panama Canal.

"Thank God every morning when you get up that you have something to do which must be done, whether you like it or not. Being forced to work, and forced to do your best, will breed in you temperance, self control, diligence, strength of will, content and a hundred virtues which the idle will never know."—Kingsley.

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Editorial

Late Syphilis in Nervous System.

Serologic examination of the spinal fluid in cases that may be called late syphilis discloses some interesting facts in connection with the Wassermann and other tests for syphilis. The phrase, late syphilis of the nervous system, has in recent years come to include a rather large group of diseases of the nervous system which, in former years, owing to the variations of symptomatology and differences of pathology were rather independently considered. So, it is interesting to bring under consideration in this comment upon late syphilis in the nervous system an etiologically related group of diseases and to present to our readers the summary of some important examinations done in the Dermatological and Urological Clinic at Tokio, as reported by the U. S. Public Health Service in *Venereal Disease Information*, Volume IV, number 7, page 256.

"1. In tabes dorsalis (19 cases) the Wassermann reaction of the spinal fluid was positive in 73.68 per cent of the cases, consequently more frequently positive than in the blood (68.42 per cent). The Lange reaction was exactly parallel with the spinal fluid Wassermann, the phase 1 reaction with the blood Wassermann. Among the cases with positive blood Wassermann there were 84.61 per cent with positive spinal fluid Wassermann and Lange reaction, 69.23 per cent with positive phase 1

reaction. Of the cases with negative blood Wassermann 50 per cent gave positive spinal fluid Wassermann and Lange reaction, 66.7 per cent positive phase 1 reaction.

"The spinal fluid in tabes dorsalis gave consequently in more than half the cases some pathological reaction, particularly when the blood Wassermann was positive. From the negative result of the Wassermann reaction alone a conclusion as to the integrity of the spinal fluid was not admissible.

"2. Dementia paralytica (9 cases) gave 88.88 per cent positive spinal fluid Wassermann, a somewhat lower per cent than in the blood (100 per cent). The Lange reaction was positive in 100 per cent, the phase 1 reaction in 66.66 per cent of the cases. The four reactions approached each other in their positive value, in their negative only the blood Wassermann and the Lange reaction agree.

"3. In syphilis spinalis (35 cases) the spinal fluid Wassermann was positive in 48.57 per cent of the cases; this was less than that of the blood (51.42 per cent). The Lange reaction gave a positive result in 68.57 per cent, the phase 1 reaction in 57.14 per cent. Only with a positive result of the Wassermann reaction in the blood could a positive result of the three spinal fluid reactions in greater range be counted on; the negative blood Wassermann, on the contrary, permits no such conclusions.

"4. In syphilis cerebri (11 cases) the spinal fluid Wassermann was found positive in 18.18 per cent of the cases, much less frequently than in the blood (54.54 per cent). On the other hand, the Lange and phase 1 reactions were positive in 63.63 per cent of the cases. The results of the three spinal fluid reactions differ very much from each other in the positive reactions; in the negative results an approximation, though not a clear one, may be shown. All in all in this group there was shown an apparent divergence of the results of the reactions.

"5. In tertiary syphilis (51 cases) the spinal fluid Wassermann was positive in 14 per cent, the Lange and phase 1 reaction in 50.98 per cent of the cases. In cases with positive spinal fluid Wassermann the other two spinal fluid reactions gave for the most part a positive result; in cases with a negative spinal fluid Wassermann, on the contrary, such an approximation was not demonstrable. The Lange reaction in negative cases agreed for the most part with the Wassermann reaction. There

existed, however, no agreement between them and the other two reactions. In cases with a positive phase 1 reaction the Lange reaction was for the most part positive. Respecting the negative reaction, the phase 1 reaction agreed almost completely with the Wassermann reaction. The other reaction was quite irregular.

"6. When one compares, respectively, the results of the spinal fluid reaction of tertiary syphilis with tabes and paralysis, one finds no agreement in the positive results.

"7. The highest percentage of positive spinal fluid Wassermans were found in paralysis (88.88 per cent), the second highest in tabes (73.68 per cent); in cerebral syphilis, spinal syphilis, and syphilis III this per cent was very low. The blood Wassermann only agreed in paralysis with the spinal fluid Wassermann; in the other conditions this was not the case. With the exception of tabes, the positive Wassermann reaction usually appeared more often in the blood than in the spinal fluid. According to the author's experience, the reacting body in the spinal fluid originates in the blood serum from which it reaches the spinal fluid through a permeability of the meninges increased by a pathologic irritation.

"8. The Lange reaction was found positive in paralysis in 100 per cent, in tabes in 73.68 per cent, and in the other conditions in over one-half of the cases. It represents, therefore, the most significant spinal fluid reaction. As to the reacting body in this reaction, the author regards it as a kind of soluble protein substance.

"9. The phase 1 reaction was positive in tabes in 68.42 per cent, in paralysis 66.66 per cent, in cerebral syphilis 63.63 per cent. In the other conditions the percentage was less than 60.

"10. Among the nervous symptoms which were most often met with in syphilis III, the most frequent were the sensory irritations (headache, pains in the shoulders or limbs, ringing of the ears, etc.). On the contrary, motor disturbances appeared seldom. Among the objective symptoms one found most frequently an increase in the reflexes, most often that of the knee.

"11. The nervous symptoms in syphilis III appeared most often in the sixth to eleventh year of the infection. (Tetsuo Kagawa, *Archiv fur Dermatologie und Syphilis*, Berlin, February, 1923, p. 322.)"

Spinal Fluid Findings in Early Syphilis.

The foregoing discussion of the spinal fluid in late syphilis is only more interesting than the following comments in incipient and early syphilis. The two summaries may well be considered together and so we freely quote this abstract from the U. S. Public Health Service. *Venereal Disease Information*, Volume IV, number 5, page 171.

"The material for this study consisted of 375 patients of the venereal military hospital in Lodz, cases ranging from the earliest period to the end of the fifth year after infection. They were divided into four groups for convenience in study.

"1. *The pre-exanthematous stage of lues*—This group includes 51 patients, with a period of infection up to seven weeks. By a study of these cases it was found that infection of the spinal fluid could take place in this stage, although relatively seldom (7.8 per cent.) Pleocytosis is the most frequent sign of spinal fluid infection in this stage (7.8 per cent). With regard to the specificity of the globulin reaction in this stage, it should be taken with a certain reservation. It seems to occur seldom (2 per cent). A positive Wassermann reaction of the spinal fluid was not found in any of these cases.

"2. *The exanthematous stage*—This group includes patients between the eighth week after infection and the end of the fourth month. Of the 72 patients of this group, 52 were untreated and 20 only very insufficiently treated. Infection of the central nervous system, according to the spinal fluid findings, existed only in one-third of these cases. In comparison with primary syphilis, the proportion is much greater (33.3:7.8). Pleocytosis is the most frequent and characteristic reaction in this stage (37 per cent). Its proportion to the other reactions is as follows: Pleocytosis: Wassermann reaction: Globulin=37:14:12.5. The globulin reaction appears least frequently (12.5 per cent). This, as an isolated reaction, is least characteristic and must be accepted with a certain reservation. The Wassermann reaction appears relatively seldom in this stage (14 per cent). In cases with pathological spinal fluid the proportion of the Wassermann reaction to pleocytosis is 40:91. A weak isolated Wassermann reaction in the spinal fluid may occur with strong blood serum reaction as the result of a diffusion of the reagin from

the blood serum into the spinal fluid. The pathological spinal fluid may be found more often with papular than with macular eruptions.

"3. *Stage of local recurrence*—This group includes cases from the 17th week to the end of the second year after infection. Of the 208 cases in this stage only 27 were untreated, the remainder, 181, had received extremely irregular and insufficient treatment. Practically no difference was found in the spinal fluid of the two groups. This infection of the central nervous system is more easily shown in this stage than in the preceding. Pleocytosis appeared in this stage almost as frequently as in the other reactions, but did not play such a dominating role as in the stage of the so-called first exanthems. Differing from the other stages where pleocytosis occurred more frequently (31:27) and especially as an isolated reaction, here it appears usually with other reactions. The globulin reaction appeared in this stage usually with the other reactions. Where clinical evidences of affection of the nervous system were present, it was always found. We found it in this group much more frequently than in the previous stages (25.5:12.5). The Wassermann reaction appeared most frequently in the stage of local recurrence. In comparison with the previous stages, much more frequently (30:14) and much stronger. Pathological spinal fluid with negative blood serum Wassermann reaction was met much more often in this stage than in the preceding. The blood findings alone are not sufficient to determine the relationship of general syphilization to infection of the central nervous system. This stage is the most valuable for the first examination of the spinal fluid. Pathological spinal fluid is encountered in this stage in many cases with, as well without, skin manifestations. Specific alopecia and leukoderma give a high per cent of pathological spinal fluids (60 per cent, 52 per cent).

"4. *Latent lues*—This group includes cases from the third to the sixth year after infection—patients with latent lues, with late local recurrences and gummata. Pathological spinal fluid could be demonstrated less often in this stage than in the stage of secondary local recurrences. Here we find pleocytosis least often (11.5 per cent), most often the Wassermann reaction (25 per cent). The globulin reaction commonly accompanies the organic nervous manifestations. Every one of the separate

pathological reactions is in this stage, a warning sign to be observed, especially in cases with negative serum blood Wassermann reactions. Between severe skin manifestations and a pathological condition of the spinal fluid there seems to be an antagonism. Of 12 cases with ulcerating gummata the spinal fluid was only once weakly pathologic. (J. Leyberg, *Dermatologische Wochenschrift*, Leipzig, Jan. 20-27, 1923, Nos. 4 and 5, p. 53, p. 86.)"

Comments on Treatment of Syphilis.

ARSENIC CONTENT OF SPINAL FLUID. The examination of 239 spinal fluids taken from 151 patients, after intravenous administration of silver arsphenamin, demonstrates the following facts:

1. Arsenic passes into the spinal fluid.
 2. Arsenic can be found in the spinal fluid at the end of two hours, in an amount as large as 134 mg. per 100 gm. of dried specimen.
 3. Arsenic can be found in the spinal fluid as late as seventy-two hours, in an amount as large as 192 mg. per 100 gm. of dried specimen.
 4. In general, the arsenic content in the spinal fluid falls after the first two hours. It rises slightly between twenty-four and forty-eight hours and, at the end of seventy-two hours, is present in greater quantity than at any time between two and seventy-two hours. (Leon H. Cornwall and C. N. Myers, *American Journal of Syphilis*, April 1923, page 287.)
- MERCURY VERSUS ARSPHENAMIN IN THE TREATMENT OF SYPHILIS.

"Brooklyn Diagnostic Institute. The injurious effects of the use of arsphenamin are discussed. In addition to its toxicity in many cases tolerance which is almost an immunity to the drug on the part of the parasite is established, with the result that further progress with arsphenamin treatment alone is impossible. The author recommends mercury as the most valuable ally in the treatment of syphilis. He also has found from his experience the best method of administration to be by inhalation, for the following reasons: (1) Inhalations are free from nauseous taste and the unpleasant gastrointestinal disturbances occurring with oral administration. (2) Their absorption is as rapid as administration by any other method, not excepting the intravenous or subcutaneous. (3) Compared with injections they have no unpleasant, unesthetic features. (4) They are definite in dosage. (5)

They never cause serious symptoms or fatalities such as often accompany hypodermic injections of mercury or arsphenamin. (Jacob Gutman, *American Journal of Syphilis*, St. Louis, April, 1923, p. 347.)

TREATMENT OF GENERAL PARALYSIS BY MALARIA.

"City of London, Mental Hospital, Dartford. The author describes the treatment of general paralysis by a subcutaneous injection of from 2 to 4 c.c. of blood from a patient suffering from benign tertian malaria. Typical malaria develops in about a week and is allowed to run through 10 to 12 attacks, after which it is cured by the administration of quinine in doses of 1 gm. for 3 successive days, then in doses of 0.5 gm. for 14 days. This is the course of treatment observed by the author while in Vienna. In no cases did the malaria persist. During the febrile attacks and occasionally after there is very often an exacerbation of mental symptoms, consisting chiefly of auditory hallucinations and delusions of persecutions. In the majority of cases these symptoms promptly disappear when the febrile attacks have terminated. Following upon the febrile attacks and going parallel with the quinine treatment, weekly doses of neosalvarsan are administered intravenously, commencing with 0.3 gm.; six doses in all are given, in the scale of 0.3, 0.4, and four of 0.6 gm.

"Complete observations were made of 296 cases so treated. Of these 112 showed complete remission with the disappearance of mental disturbances and a return of former business capacity. Sixty-eight per cent of those observed showed remissions in spite of the fact that many advanced cases were included. Of the total for whom complete remission was claimed, only three have relapsed or showed any tendency to relapse.

"This form of treatment is difficult in England because of the absence of the malaria parasite. Once a single case has been inoculated the infection may be transferred to other paralytics, though this involves the transference of syphilitic blood. In Vienna this method of continuous transference is used.

"In general the histological changes in cases showing remission under malaria treatment were those of the so-called stationary paralysis of Alzheimer, with an almost complete absence of the changes usually found in progressive general paralysis. (W. L. Templeton, *British*

Medical Journal, London, May 26, 1923, p. 895.)

BISMUTH AS A SUBSTITUTE FOR ARSPHENAMIN.

"The use of bismuth in the treatment of syphilis is discussed. Although the end results of bismuth therapy are not yet obtainable, its use in cases where the invading spirochete has apparently acquired a degree of tolerance for mercury and arsphenamin is of value. Authors using bismuth report that the drug is unusually stable and of low toxicity when given subcutaneously or intramuscularly. Under treatment with bismuth the spirochetes disappear from the primary sore after the first to the third injection. The effect of the drug upon the Wassermann reaction is as satisfactory, if not more so, than the effect of arsphenamin. (*American Journal of Clinical Medicine*, Chicago, May, 1923, p. 375.)

NEW BISMUTH THERAPY OF SYPHILIS.

"The author discusses the value of bismuth therapy of syphilis. The hydroxide and the iodoquininate of bismuth have been generally adopted as the most efficient for routine use as well as least painful and toxic. Both salts are insoluble and are administered in oily suspensions by intramuscular injections. The dosage of each is from 6 cgm., the minimum initial dose, to 15 cgm., the usual maximum. The average course consists of 10 to 15 injections, usually three a week, totaling 1 to 2 gm. of bismuth. This is followed by a rest period of about one week, after which the course is repeated.

"Bismuth acts as a true antibody and is the most potent spirocheticide available. In the majority of cases in the primary stage studied no spirochete could be demonstrated 24 hours after the first injection. The effect of bismuth upon the Wassermann reaction compares favorably with that of salvarsan. Bismuth also has the power of rendering the serum negative in the so-called arsenic-fast cases. In tabes dorsalis the specific action of bismuth is most marked. Tertiary syphilis, on the whole, reacts well to bismuth therapy. Successful results have also been obtained in treating hereditary syphilis with bismuth. The potency of the drug would seem to be partly associated with its excretion. It is eliminated chiefly by the salivary glands and the kidneys and into the cerebrospinal fluid, where it is most effective.

"Seventy per cent of the patients bear bis-

muth well. In 30 per cent of the cases some sign of toxicity presents itself, such as a mild form of stomatitis and salivation. A more severe form may be gingivitis which may go on to ulceration. No serious manifestations of toxicity have occurred. Cessation of the administration of the drug is followed almost at once by a disappearance of the toxic signs.

"The place of bismuth in the routine treatment of syphilis, according to the practice of most of the large European clinics, is as follows: First an intensive attack upon the infection with salvarsan (or neosalvarsan), consisting of a course of 8 to 12 intravenous injections, totaling approximately 10 gm.

of neosalvarsan, followed by a rest period of about one week. Bismuth is next administered by a course of 10 to 15 intramuscular injections. After another rest interval the treatment is continued by mercury in one or another of its forms. (C. I. Gross, *Canadian Medical Association Journal*, Montreal, April, 1923, p. 265.)"

Our New President.

The highest honor at the disposal of The Medical Society of Virginia was worthily bestowed, at the Roanoke meeting in October, by the election of Dr. William W. Chaffin, of Pulaski, to the presidency of that organization.

His professional qualifications are such as to merit honor, while his intellectual attainments, his genial courtesy, and his consideration for others, will make his elevation doubly acceptable to his brethren of the profession.

Dr. Chaffin was born in Wythe County, Virginia, May 5th, 1868. He took his collegiate course at Washington and Lee University. He graduated with the degree of M. D. from Jefferson Medical College, Philadelphia, in 1893, and joined the Medical Society of Virginia the same year. After graduation he was an interne of Jefferson Hospital and of the Episcopal

Hospital, Philadelphia, and later of Gouverneur Hospital, New York.

He located in Pulaski in 1895. During his residence there he has been a public spirited citizen, closely identified with every effort made for the advancement and improvement of the town and community, and has served for a number of years as a member of the City Council. By his energy and devotion to his profession he has built up a large practice both in medicine and surgery. After a service to his people of twenty-eight years, he is still the same faithful physician going about doing good.

Dr. Chaffin was one of the first members of the State Board of Health. He has been on the State Medical Examining Board since 1911. He was a charter member of The Southwestern Virginia Medical Society and served one term as its President. He is a member of the American Medical Association, The Southern Medical Association, The Tri-State Medical Association of the Carolinas and Virginia, Chairman of the Pulaski County Board of Health, and has been a Surgeon of the Norfolk and Western Railway since 1896.

In the long, long ago, in the dim and distant past, at the time "When the memory of man runneth not to the contrary," some one said:

"Physicians! Pray to the Gods for a fair measure of the love of Science, a good memory, a quiet manner, the accurate use of your hands and senses. Pray even for opposites, for humility and pride, for plodding business ways and for the wings of ambition, for a will both stubborn and flexible, and above all for that one gift which has been the making of the best men in our profession, the grace of simplicity of purpose."

It is not known whether Dr. Chaffin ever offered this prayer, but it is well known that he has received the blessing, and those who know him best esteem him most.



W. W. CHAFFIN, M. D.,
President Medical Society
of Virginia.

News Notes

The Roanoke Convention.

The recent meeting of the Medical Society of Virginia will long hold many pleasant memories for those who were fortunate enough to partake of the hospitality of this progressive Virginia city. Dr. John O. Boyd, general chairman of the Committee on Entertainment, and his able co-workers, did everything that could be desired for the comfort and entertainment of their visitors. There was a registered attendance of 502, including the ladies, who evinced great interest in the Woman's Auxiliary, which held two sessions. Mrs. J. W. Preston, chairman of the Ladies' Committee, and her associates provided several attractive entertainments and rides for the ladies, in addition to the buffet dinner and dance on Wednesday evening and the barbecue at Lakeside on Thursday, in which both the doctors and the ladies participated. The President, Dr. John Staige Davis, of the University of Virginia, saw that the scientific and business meetings were on schedule time, so that there was plenty of time for pleasure as well as work.

The commercial exhibits were most attractive and always had a number of visitors.

An innovation at this meeting was the golf tournament, which it is hoped may be made an annual event. Dr. Fred M. Hodges, Richmond, won the first leg on the cup donated by the Roanoke Academy of Medicine. Dr. F. C. Rinker, Norfolk, was runner up, and Dr. Stuart Michaux, Richmond, won third place. Dr. J. W. Carroll, Lynchburg, had low gross score.

Dr. W. W. Chaffin, Pulaski, was elected president for the coming year and Staunton was selected as the 1924 place of meeting, the date to be decided upon later. The full list of officers is given under Society Proceedings, elsewhere in this issue.

The one regret of the meeting was the resignation of Mr. G. H. Winfrey as secretary-treasurer of the Society, his resignation to be effective December 31. During his four years as secretary-treasurer, Mr. Winfrey has, by his efficient service and genial personality, won for himself many friends among the doctors who will be interested in hearing of his continued success in the years to come.

Woman's Auxiliary, Medical Society of Virginia.

The annual meeting of the Woman's Auxiliary was held in the parlors of the Hotel Roanoke on Wednesday, October 17. Mrs. R. Lloyd Williams, of Norfolk, presiding, Mrs. R. W. Miller, Richmond, in the absence of Mrs. Burnley Lankford, of Norfolk, was appointed acting secretary. Report from the delegates to the American Medical Association at San Francisco was read by Mrs. J. Allison Hodges, and reports from city and county Auxiliaries, recently organized, were also read. The report of the committee on Constitution and By-Laws was read, and each article voted upon separately, and this report, with a few corrections, was unanimously adopted. The meeting was the largest that has been held, and was an unusually enthusiastic one.

The Auxiliary met again on Thursday morning, and was addressed by Dr. Seale Harris, of Birmingham, Ala., who told of the arrangements and program outlined for the Auxiliary at the meeting of the Southern Medical in Washington on November 12-15; by Dr. R. Lloyd Williams, of Norfolk, Chairman of the Executive Council of the Medical Society, who expressed the thanks of the society for the aid of the Auxiliary; and by Dr. J. Allison Hodges, of Richmond, who spoke of a further opportunity for service in assisting the State Public Health League, just being organized by the Medical Society. Much interest was displayed by the members in this movement, and the desire to aid the physicians in every way possible was unanimous and most encouraging.

As the Constitution calls for the bi-annual election of officers, the following elected in Norfolk in 1922, hold over for the coming year: President, Mrs. R. Lloyd Williams, Norfolk; Vice-Presidents, Mrs. J. Allison Hodges, Richmond; Mrs. S. S. Gale, Roanoke; Mrs. Southgate Leigh, Norfolk; and Mrs. W. E. Anderson, Farmville; Recording Secretary, Mrs. Burnley Lankford, Norfolk; Treasurer, Mrs. Starke Sutton, Norfolk.

The American College of Surgeons

Held its annual meeting in Chicago, October 22-26, with a very large attendance. Five hundred and twenty-seven surgeons, representing North and South America, were elected to fellowship. Of these, five were from Vir-

ginia, as follows: Drs. Arthur S. Brinkley, Paul W. Howle and Ben H. Gray, from Richmond; Dr. O. T. Amory, Newport News; and Dr. J. M. Emmett, Clifton Forge. The following were elected, honorary fellows: Surgeon General Hugh S. Cumming, of the U. S. Public Health Service, Washington; Sir Wm. I. de Courcy Wheeler, President of the Royal College of Surgeons of Ireland; and Mr. A. E. Webb-Johnson, Fellow of the Royal College of Surgeons of London.

The 1924 meeting will be held in New York City, the exact date to be named later. Dr. A. J. Ochsner, Chicago, is president; Dr. Charles H. Mayo, Rochester, Minn., president-elect; and Dr. Franklin H. Martin, Chicago, continues as secretary-general.

Erratum.

In our October issue we published an article by Dr. William R. Rogers, of Bristol, Va., entitled "Pott's Disease, with Special Reference to its Diagnosis." Some "printer's devil" must have been turned loose on Dr. Rogers' paper as, in making a slight correction marked in the proof, Dr. Rogers' name was butchered to read "Wm. F. Rogers, M. D."

We wish to apologize to Dr. Rogers on our own behalf as well as for the printer, that such liberty should have been taken with his name and that he should fail to receive proper credit for his most excellent paper which was the result of much study.

Married.

Dr. A. S. Priddy, superintendent of the State Epileptic Colony at Madison Heights, Va., and Mrs. Mamie H. Mitchell, Alexandria, Va., October 20.

Dr. M. E. Mease, Sandy Level, Va., and Miss Annie Edwards, Lynchburg, Va. October 13.

Dr. Robert Wilson Selby, Middleburg, Va., and Miss Mae Diller, or Rehoboth Church, Va., November 1.

Dr. Marshall L. Boyle, Jr., Richmond and Miss Elise Leckie, Lynchburg, Va., October 20.

Dr. Robert Minor Baker and Mrs. Ruby Gornto Jones, both of Jacksonville, Fla., October 18. Dr. Baker is originally from Richmond and Fredericksburg, Va., but has practiced in Jacksonville, Fla., for several years. He is a member of the class of '18, Medical College of Virginia.

Dr. E. L. Kendig,

Victoria, Va., has been commissioned by Governor Trinkle as a member of the Board of Visitors of the Medical College of Virginia, Richmond, to fill the vacancy caused by the death of Dr. H. S. Myers, of Amherst County.

Dr. W. C. Harman,

Dolphin, Va., was recently in Baltimore, Md., on a business trip.

Dr. R. E. Mitchell,

Richmond, has completed a course on eye, ear, nose and throat work at the Brooklyn Eye and Ear Hospital, and has opened offices at the new Medical Arts Building, at Second and Franklin Streets, this city. While waiting for his offices to be completed, he has been taking a special course on bronchoscopy and esophagoscopy, given by Dr. Chevalier Jackson, of the University of Pennsylvania. He will complete this course about the twentieth of this month.

Dr. F. P. Coombs,

Recently of Mt. Jackson, Va., announces his removal to R. F. D. 2, from Morgantown, W. Va.

The Association of Surgeons of the Norfolk and Western Railway

Held its ninth annual meeting in Cincinnati, O., September 12 and 13. Hotel Gibson was headquarters for the meeting. Dr. W. E. Anderson, Farmville, Va., president, and Dr. T. D. Armistead, Roanoke, Va., secretary-treasurer. The scientific and business meetings were held on the 12th, and, though the Association was organized primarily as a social rather than a scientific gathering, there was a good program. Among the interesting papers read were those by Dr. George Tully Vaughan, Washington, D. C., and Dr. C. C. Coleman, Richmond, on cranial injuries. At the business meeting, Dr. Robert Carothers, Cincinnati, was elected president for the coming year, and Dr. T. D. Armistead, was re-elected secretary-treasurer. The 1924 place of meeting is to be selected by the Executive Council.

Dr. Carothers, chairman of the local committee of arrangements, had secured theater tickets for the first evening, for the surgeons their wives and daughters. The second day was devoted to golf, a trip to the zoo, and any other amusements desired.

Dr. Richard Lee Willis, Chatham, Va., and Miss Elizabeth Harris, Crozet, Va., recently. Dr. Willis graduated in medicine from the University of Virginia in 1921, at which time he was appointed as interne at the Post-Graduate Hospital, New York City.

Dr. David Thomas Tayloe, Jr., and Miss Eleanor Berry, both of Washington, N. C., October 2.

Dr. Allen F. Voshell,

Instructor in orthopedic surgery at the University of Virginia, addressed the Danville Academy of Medicine at its regular meeting in October. The following day he held clinics for crippled children in that vicinity.

Dr. Elbert B. Talbot

Returned to his home in Richmond, early in October, after spending sometime in New York City.

Dr. Mary Evelyn Brydon,

Director of the Bureau of Child Welfare of the Virginia State Board of Health, represented Virginia at the meeting of the American Child Health Association, held in Detroit, October 15-17, inclusive.

Dr. and Mrs. Fitzhugh Banks

And family, of Richmond, spent the summer months at their former home in West Virginia.

Dr. Easley's Home Destroyed by Fire.

The home occupied by Dr. E. M. Easley, near Rushmere, Va., was completely destroyed by fire, early in October. The cause of the fire is not known but it is presumed to have been caused by defective wiring of the electric lighting system. The loss was covered by insurance.

Dr. J. Blair Fitts,

Richmond, is out again after undergoing an operation for appendicitis, in October.

Huntington Eye, Ear and Throat Hospital

Is the new name by which the former Moore-Beckner Hospital, of Huntington, W. Va., will be known. Drs. Thomas W. Moore and William F. Beckner are physicians in charge.

Dr. Charles K. Mills,

Philadelphia, was elected president of the American Neurological Association, at its annual meeting recently held in Boston.

Dr. and Mrs. C. H. Iden,

Berryville, Va., were visitors in Richmond in October.

Member W. Va. Health Council.

Dr. Olin H. Jennings, Williamson, W. Va., has been appointed a member of the West Virginia Health Council, to succeed Dr. Benjamin F. Shuttleworth, of Clarksburg.

The Seaboard Medical Association of Virginia and North Carolina

Will meet in Newport News, Va., December 4, 5 and 6, 1923, under the presidency of Dr. Joseph T. Buxton of that city. An elaborate program is being arranged. There will be two mammoth public meetings one dealing with medical education and the other with child welfare. An intensely scientific feature, from a general standpoint, will be "A Study in Color Photography," by Dr. Henry O. Reik, of Baltimore. Extensive social features also will be provided.

This organization is one of the most alive in the United States and owes much of its success to having each paper discussed, some one being appointed to lead the discussion in each case. Dr. Clarence Porter Jones, Newport News, is secretary, and Dr. George A. Caton, New Bern, N. C., treasurer.

Mexican Society Honors American Surgeons.

The Academy of Medicine of Mexico City, at a recent meeting, unanimously elected to honorary membership Drs. W. J. Mayo, of Rochester, Minn., and A. J. Ochsner, of Chicago.

The Association of Military Surgeons of the U. S.

At the annual meeting of this Association, held at Carlisle Barracks, Pa., the time was mostly given up to practical demonstrations, only two papers being read. There was an attendance of over 250. Col. Gilbert E. Seaman, M. C., Milwaukee, of the Wisconsin National Guard, was elected president.

Col. J. Fulmer Bright, M. C.,

Richmond, commander of the 183rd infantry, was detailed to represent the State of Virginia at the convention of the National Guard Association, held in Denver, Colo., the latter part of October.

Dr. L. Emmett Holt,

Eminent pediatricist of New York City, has been assigned as visiting professor of pediatrics to the Peking (China) Union Medical College, by the Rockefeller Foundation. He started with these lectures in October and will

give a three months' series, telling the physicians of China of our latest methods in child culture. Upon completion of this service, Dr. Holt will visit a number of foreign countries, making a survey of child health methods. He will not return to this country until next summer.

The Lewis-Gale Hospital Clinic,

Roanoke, Va., announces the entry to its staff of Dr. Linwood D. Keyser, for the practice of surgery and urology. He will have offices at the Lewis-Gale Hospital.

American Public Health Association.

At the meeting of this Association held in Boston in October, there was a registered attendance of more than 800. Among the matters receiving special indorsement of the Association was the periodic physical examination of apparently healthy persons, and all citizens of the countries represented in this organization are urged to have such medical examinations made. The next annual meeting is to be held in Detroit. Dr. William H. Park, director of the Bureau of Laboratories of the New York City Health Department, was elected president, and Dr. James A. Hayne, commissioner of health of South Carolina, executive secretary.

News of St. Elizabeth's Hospital, Richmond.

Dr. J. S. Horsley, Jr., who recently returned from working in the Pathological Department of the Mayo Clinic, Rochester, Minn., is now first assistant to Dr. J. Shelton Horsley at St. Elizabeth's Hospital, Richmond. Dr. A. I. Dodson is confining his work entirely to urology. Miss Myra Stone, who has been superintendent for several years, has resigned and will be succeeded by Miss Rose Z. Van Vort, who has been with Stuart Circle Hospital, this city, since its opening. She will inaugurate a training school for nurses at St. Elizabeth's.

As a token of love and admiration, the general duty nurses at St. Elizabeth's presented Miss Stone with a gift just prior to her departure. She will rest for several weeks before undertaking other work.

Chiropractors Live Hard in South Carolina.

According to the *Journal of the A. M. A.*, the Cherokee County (S. C.) Medical Society protested against the city of Gaffney granting a license to a chiropractor who came there from North Carolina. The president of the

Society stated that, if this chiropractor received a city license to practice in Gaffney, a warrant for his arrest would be sought on a charge of practising medicine without a license from the State Board of Medical Examiners.

Dr. L. F. James,

Richmond, is now in New York City, where he is taking a post-graduate course in gynecology and obstetrics.

Drs. Willis and Johns.

Dr. A. Murat Willis and Dr. Frank S. Johns, Richmond, who have been associated in surgery for ten years, announce a formal partnership under the name of Drs. Willis and Johns. Their offices are at Johnston Willis Sanatorium, this city.

The Richmond Academy of Science

Has been organized with Dr. J. Allison Hodges, of this city, as president, Mr. George Bryan, a prominent attorney of this city as vice-president, Wortley F. Rudd, Medical College of Virginia, treasurer, and G. H. Winfrey, secretary. The board of directors the first year consists of a number of prominent physicians, lawyers, ministers, architects and engineers. A site has been secured on West Franklin Street on what was formerly the campus of Richmond College. It is confidently hoped that a suitable building, with an auditorium, will be constructed in the near future, providing headquarters for the various professional and scientific organizations of the city and state.

Christmas Seal Sales

Will be held throughout the country this year, as in the past, to help in the big educational campaign carried on by the National Tuberculosis Association and its 1,200 state and local associations. In 1907, 300,000 seals were sold; in 1922, 3,842,500; and for 1923, over one billion seals will be for sale. The work done by tuberculosis organizations is so well known to the profession that it is unnecessary for us to give it in detail. Do your bit.

Dr. and Mrs. L. T. Royster,

Who have made their home in Norfolk for a number of years, have moved to University, Va., where Dr. Royster has accepted the appointment as professor of pediatrics.

Child Welfare Clinic.

At a recent meeting of the members of the McGuire Newton Memorial Foundation, it

was decided that this foundation should be a trust fund, the income from which will be at the disposal of the trustees for child welfare work in Richmond. This fund will be in the form of a perpetual endowment, will be unlimited, and contributions will continue to be received.

The New Competition.

Many progressive manufacturers and merchants say that the cut price bait is losing its attraction. They are paying less attention to this method of getting more business, and more attention to the idea of quality merchandise service. They believe the results so far achieved justify the statement that their customers will be better served and their own profits enhanced by giving more attention to quality, and less to price.

Real service is what counts. While many people will shop about for prices, the great majority are better satisfied with quality merchandise and good service at a fair price. This makes for confidence—the corner stone of satisfaction.

Mr. Charles Wesley Dunn, Counsel for a number of large manufacturers in this country, has given this problem a great deal of thought. His conclusion is that we are now approaching the time when the real competition will be in merchandise and service rather than in price.

As a nation, we have developed to the highest degree the science of quantity production. Now, with characteristic American progression, it is only natural that we are experiencing a very definite trend toward the development of *quality* production.

Dr. C. P. Hutchison,

Purcellville, Va., was called to Westhampton College, Richmond, last month, by the illness of his daughter.

Dr. E. M. Chitwood,

After spending some time in New York, taking post-graduate work and placing particular emphasis on diseases of children, has returned to his home in Wytheville, Va.

Dr. E. S. Lester,

After several months at Bluefield, W. Va., returned to his former home at Danville, R. F. D., 2, Va., the first of November.

Dr. Howard L. Mitchell,

Of Callands, Va., is now taking a special course in eye, ear and throat work at the

Episcopal Eye, Ear and Throat Hospital, Washington, D. C.

Dr. Henry E. Davis,

Medical inspector on the staff of the Richmond health bureau since last April, has resigned to engage again in the private practice of medicine. The medical inspection work will be handled by Dr. G. R. Maloney, the other medical inspector, until Dr. Davis' successor is appointed.

The Near East Relief,

Incorporated by an act of Congress, is feeding approximately two hundred thousand children located in orphanages and other institutions in Armenia, Syria, the Caucasus, Greece and the Isles of Aegean Sea. This is the largest child feeding clinic in the world. To carry on this work, the Near East Relief, 151 Fifth Avenue, New York City, makes various appeals to collect clothing, money and food. Milk has been successfully used as an article of diet for infants and older children, and an appeal is especially made for condensed milk.

Any contribution you may be able to send to the above given address will be much appreciated and will be used for the maintenance of these little ones.

Dr. W. C. Rosser,

Rustburg, Va., is one of the board of directors of the Campbell County Bank, which has just applied for a charter to do business at that place.

Dr. E. Govan Hill,

Of Richmond, returned home the latter part of October, after attending the Seale Harris Clinic, in Birmingham, Ala., where Dr. F. G. Banting demonstrated the use of insulin.

Major Allen J. Black,

Of the medical corps, U. S. Army, formerly of Virginia, has been transferred from Fort Terry, N. Y., to Fort Andrews, Mass.

Dr. Z. G. Phipps

Announces change of his postoffice from Bridle Creek, Va., to Galax, Va.

Dr. Henry Clay Smith,

For some time of Crewe, Va., has moved to Williamson, W. Va.

Slogan Wanted for Savannah.

The city of Savannah, Ga., through its Board of Trade, want a slogan or motto which will help sell the city to the world at large. A cash prize of \$100 is offered for the best slogan in

the contest. The contest is open to anybody, anywhere, and contestants may submit as many slogans as they desire but, to be eligible, all slogans must reach the "Savannah Slogan Committee, Board of Trade, Savannah, Ga.", by noon, December 15, 1923. The slogan should be brief (within five words, if possible), clear-cut, and reflect in as few words as possible the advantages of Savannah. Write each slogan plainly on a blank sheet of paper and put your name and address at the top of the sheet.

The committee will not answer inquiries about the contest by correspondence.

"Savannah's advantages include fine harbor and marine terminal, unsurpassed rail transportation facilities, unexcelled climate, physical beauty and an almost continuous flood of golden sunshine. It is a veritable forest city of beautiful homes and offers unsurpassed opportunities in industry."

Dr. Charles W. Putney,

Recently of Covington, Va., has located in Central Building, Staunton, Va., for the practice of general medicine and surgery.

Dr. A. C. Fox,

After a number of years in Waynesboro, Va., has moved to Lincolnton, N. C., and will limit his work to pediatrics.

Nobel 1923 Prize Awarded.

The council in charge of making the Nobel prize awards has given the 1923 prize conjointly to Dr. Frederick G. Banting, of London, Canada, and Dr. J. J. R. Macleod, Toronto, for their discovery of insulin. They will receive \$20,000 each.

Dr. Clifton M. Miller,

Richmond, was one of a large party of Kiwanians to attend the district convention in Baltimore, in October.

Dr. E. N. Lillard

Announces change of his address from Graves Mill to Brightwood, Va.

Major Richard G. Simmons,

Roanoke, of the medical officers' reserve corps, in charge of the U. S. Veterans' Bureau at that place, has been assigned as regimental surgeon of the 317th infantry. He will continue his present work with the Bureau.

Mississippi Valley Medical Association.

Dr. Charles A. L. Reed, Cincinnati, O., was elected president of this Association at its meeting held at Hot Springs, Ark., last month. Dr. John L. Tierney, St. Louis, is secretary.

The Southern Surgical Association

Is to hold its annual meeting at White Sulphur Springs, W. Va., December 11, 12 and 13, under the presidency of Dr. James F. Mitchell, Washington, D. C. Dr. H. A. Royster, Raleigh, N. C., is secretary. Dr. H. H. Trout, Roanoke, Va., is chairman of the committee of arrangements. This Association met at White Sulphur Springs also in 1916.

Dr. Charles R. Robins,

Richmond, was appointed by Dr. J. S. Davis as representative of the Medical Society of Virginia, to appear with a committee before the Governor in October, urging an appropriation for building a road between Williamsburg and Jamestown.

Dr. Gerald A. Ezekiel,

Richmond, announces the removal of his offices to The Brunswick, 1652 West Grace Street, this city, with entrance on Allen Avenue. He has added a great deal of new equipment to his offices.

The Kentucky State Medical Association.

At its annual meeting recently held at Crab Orchard, Dr. Frank Boyd, Paducah, was elected president, and Dr. A. T. McCormack, Louisville, was re-elected secretary to serve a term of five years.

Major Herbert C. Mallory, M. C.,

Who has been stationed in Richmond for little more than a year, sailed from San Francisco, October 23, for the Hawaiian Islands, where he has been assigned to duty.

Salvation Army Hospital Opened.

On the afternoon of October 21st, the Evangeline Booth Home and Hospital was opened for inspection of the advisory board and woman's auxiliary, that they might see the repairs and improvements made. The home is located in Highland Park, this city. The hosts on this occasion were the medical staff, composed of Dr. Robert C. Bryan, chief of staff, and Drs. Ben H. Gray, Paul Redd, Thomas W. Murrell, Clifton M. Miller and Garland M. Harwood.

Dr. Richard H. Meade, Jr.

A former Richmonder, who studied first at the University of Virginia and later at Harvard, graduating from the Harvard Medical School in 1921, has been appointed a medical missionary to St. James Hospital, Anking, China. He will assist Dr. Henry R. Taylor, formerly of Norfolk, who is now in charge

of this hospital. Dr. Meade received his appointment through the domestic and foreign mission board of the Episcopal church and will leave for China next August.

The Red Cross Roll Call

Is now on. When the humanitarian work done by this organization is recalled by doctors, they, of all people will wish to continue membership. If not now a member, there is not better time to pay \$1 for membership.

Cancer

Is a new practical quarterly journal devoted to the study of and reporting of cases of cancer. It made its initial appearance in October, under the editorship of Dr. L. Duncan Bulkley, of New York, one of the country's best informed men on this subject. He has several prominent doctors associated with him. The publishers are F. A. Davis Company, Philadelphia, and the price is \$5.00 per volume in North America.

Dr. Duncan Eve, Jr.,

Nashville, Tenn., was elected president of the American Association of Railroad Surgeons at its meeting in Chicago, last month.

Dr. Robert P. Kelly

Has returned to Lynchburg, Va., after spending six months at the Chicago Lying-In Hospital with Dr. Joseph B. De Lee and staff. Dr. Kelly will continue to limit his practice to obstetrics. This appointment was quite an honor, Dr. Kelly being the first Virginian to have received it.

Dr. and Mrs. Adam T. Finch,

Chase City, Va., were recent visitors in Richmond.

Dr. and Mrs. E. A. Terrell,

Fredericks Hall, Va., spent several days in Washington, the latter part of October, after attending the marriage of their son, Mr. E. A. Terrell, Jr., to Miss Virginia Andes.

Dr. Thomas E. Hughes,

Formerly of Wright, Fowlkes and Hughes, announces the removal of his offices to the Medical Arts Building, at Franklin and Second Streets, Richmond, Va. He will limit his practice to diseases of the ear, nose and throat.

Dr. Susan A. Price,

Who has been connected with the medical staff of the State Hospital at Weston, W. Va., for the past year, will spend this winter in taking a vacation and rest in Baltimore, Md.

Dr. and Mrs. Edward Sandidge,

Of Amherst, Va., recently enjoyed a vacation on the Eastern Shore of Virginia.

Virginia Baptist Hospital to Open Soon.

At a recent meeting of the board of trustees of the Virginia Baptist Hospital, of Lynchburg, Va., it was announced that it is expected the hospital will be ready for occupancy about the first of April, 1924. Several memorial rooms have already been provided for in this hospital.

Miss Mary F. Cowling, of Lynchburg, has been appointed superintendent of the new hospital.

Dr. T. N. Davis, Jr.

Has been elected surgeon, for the coming year, of the Lynchburg, Va., Post 16, American Legion.

Dr. Eugene Rogers

Has returned to his home in Covington, Va., after an extended visit to relatives in Chicago, Ill.

Dr. J. K. Hall,

Of Westbrook Sanatorium, Richmond, recently visited friends in Buckingham Co., Va.

Dr. Clarence Campbell,

Until recently of Sparta, Va., moved to Williamsburg, Va., about the first of November, and will continue the practice of general medicine in that place.

Dr. Joseph T. Buxton,

Who was recently operated upon by Dr. George W. Crile, at Lakeside Hospital, Cleveland, Ohio, has returned to his home in Newport News, Va., and resumed his work.

Dr. E. L. Sutherland,

After practising for sometime in Roanoke, Va., has located in Charlottesville, Va., and will limit his work to diseases of the eye, ear, nose and throat.

Dr. C. S. Dodd

Returned to his home in Petersburg, Va., the latter part of September, after visiting abroad and spending three months in post graduate work at the University of Vienna.

Dr. R. D. Garcin,

Richmond, after an illness of several weeks, has resumed his practice.

Dr. Thomas F. Wheeldon,

Richmond, has been appointed medical officer, with the rank of captain, of the permanent field artillery examining board for the Third Corps Area, recently established in Richmond.

Dr. John H. Neff,

Of the faculty of the University of Virginia, was the principal speaker before the Richmond Chapter of the University of Virginia Alumni, at their monthly dinner, the latter part of October.

Charles Street: Its History and Growth

Has been published again this year by the Charles Street Association of Baltimore, Md. This little pamphlet tells of many of the places of interest to visit in and around Baltimore and also of the places to shop while there. It contains only 30 pages. Headquarters of the Association are in Fidelity Building, Baltimore.

For Sale,

One Wappler Bedside unit, capacity 30 M. A. on 110 volt, alternating current, complete with tube. Carefully used one year. Cost \$885; price \$600, easy terms. Write "X. Y. Z.", care this journal. (Adv.)

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Location Open for Physician.

We have just been advised that Dr. I. H. Thomas, of Sterling, Loudoun County, Va., has retired from practice and that the people in that community are in need of a physician. A petition to this effect from the citizens of that community has been received at the offices of the State Board of Health, Richmond.

Wanted—

Assistant physician, Mental Diseases, \$1,800—\$2,000 and maintenance. Assistant physician, Tuberculosis, \$1,140—\$1,500 and maintenance.

Apply State Employment Commission, 22 Light Street, Baltimore, Maryland. (Adv.)

Obituary

Dr. Robert Graham Wiatt,

Assistant professor of roentgenology at the University of Virginia, was instantly killed by an automobile, on the night of November 2. He had just reached Gloucester, Va., that day, for a visit to his mother and, with a little nephew, was on his way to a basket ball game

when he was run down by the car. His neck was broken and leg badly fractured. Dr. Wiatt was born in Gloucester County, Va., 29 years ago and studied medicine at the Medical College of Virginia from which he graduated in 1914. After this he served an internship at Stuart Circle Hospital, Richmond. Prior to entering the medical corps in the World War, he practiced in Richmond. Upon his return he located at the University and, at time of his death, was assistant professor of roentgenology in the Medical Department of the University of Virginia. Dr. Wiatt is survived by his wife, a son by his first marriage, his mother, and several sisters and brothers.

The interment was made in Gloucester County, with Masonic honors.

Dr. Henry Samuel Myers,

Formerly of Forks of Buffalo, Va., owing to despondence and ill health, committed suicide on the evening of November the 2nd, by firing a bullet through his temple, while in his room at Amherst White Sulphur Springs, Va. Death resulted immediately.

Dr. Myers studied medicine at Medical College of Virginia, from which he graduated in 1892. He had been a member of the Medical Society of Virginia since 1894. Dr. Myers had practiced in Amherst County since that time and once represented his county in the State Legislature. He is survived by three children.

Dr. Henry Enos Tuley,

One of the best known physicians of Louisville, Ky., died October 21, at the age of 53 years. He graduated from the Medical Department of the University of Louisville in 1890 and later from the New York Polyclinic Medical School and the Kentucky School of Medicine. Dr. Tuley was for twenty-five years the secretary and, for the past year, president of the Mississippi Valley Medical Association. At the time of his death, he was dean and professor of pediatrics at the University of Louisville, Medical Department. He was also an interested worker in the American Medical Association and the Kentucky State Medical Association.

Dr. Nicholas Perkins Oglesby,

A member of the Medical Society of Virginia, of Dublin, Va., died from heart disease, in Cincinnati, September 12. He was 49 years of age and graduated from Starling Medical College, Columbus, Ohio, in 1904. He was a Spanish-American War veteran.



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OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Vol. 50, No. 9.
WHOLE No. 858.

RICHMOND, VA., DECEMBER, 1923

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Official Organ of the Medical Society of Virginia

Vol. 50, No. 9.
WHOLE No. 858.

RICHMOND, VA., DECEMBER, 1923

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Original Communications

SURGICAL STUDIES IN THE SO-CALLED FUNCTIONAL PSYCHOSES.*

By JOHN WILLIAM DRAPER, M. D., F. A. C. S., New York, N. Y.

Surgical studies looking to the relief of the mentally afflicted are not new. It is the trend which is new. Heretofore, such surgical work as was done was directed largely, if not exclusively, toward the relief of malformation, both congenital and acquired, of acute infections, and toward the removal of tumors. With the advent of aseptic surgery a great deal of work was done upon the female pelvis and upon the cranium. The results were disappointing. It was reluctantly to be admitted that the application even of aseptic surgery could avail little or nothing in raising the discharge rate at the State Hospitals for the insane. With the acceptance of this depressing fact it was natural that the views of the fatalists should again predominate; and that those who sought to interfere with so-called "inevitable" events, were returned to the discard. For from time immemorial there has existed in the study of this branch of human disorder, as indeed of all human disorders and all fields of human endeavor, two diametrically opposed schools or systems. The one viewed the problems from a theistic or spiritual standpoint; the other, usually much in the minority as regards numbers, based its reasoning upon material standards. It urged, then as now, a physical basis for life, and that, as there could be no function without form so there could be no aberrant function without aberrant form. The protagonists of these two schools have left traces of active and interesting strife dating back to early Egyptian history, but the written record of the conflicting standards by which human beings have sought to interpret the limitations, both physical and mental, imposed by disease upon their own kind, has been more definitely

chronicled since the early days of the Christian era. Anyone who is interested in studying the cause of the divergent opinions, which at present exist in the viewpoints of the men who have given their lives to the study of the insane, will recognize at once that these differences are due to the presence today of these two great schools of thought. They may be referred to as theological and scientific, and the divergencies of opinion so strongly marked in the circumscribed field of psychiatry are the natural result of the age-old conflict between theology and science.* But, as there is good in each, let us hope that these two schools may soon be brought into productive co-operation.

After a five years' experimental study of the intricate physical conditions to be found in the bodies of patients who are mentally afflicted, it would seem to the writer urgent that the exponents of the metaphysical school should hasten to join forces with the physicists, as the growing school of the literal adherents of Virchow may properly be termed. For while it is true that in the last generation, and even earlier, many of the props have been taken from the metaphysical interpretation of medicine, particularly as regards the causation of ordinary bodily ailments, there yet remains and will always remain a halo of interest and a just reverence due the supernatural. Is it not true that a curb has been put upon our tendency to explain by physical interpretation problems, both of mind and body, because of the fear that in so doing we may violate that something within us which grants reverence to the supernatural and which causes us to fear that our religious beliefs may be damaged or taken from us by the interpretation of mysteries upon physical facts. Most of us are demologists and it is easy to believe in the miraculous origin of insanity. However, the amazing discoveries of modern science, far from weakening our reverence for the unattainable, go far to strengthen and sustain it. Witness

*Read by invitation at the fifty-fourth annual meeting of the Medical Society of Virginia, October 16-19, 1923.

*J. W. Draper, *The Conflict between Religion and Science*, Appleton and Co.

the new proof of the immortality of the light wave which travels unaltered through thousands of light years. Is not this vibrant energy indeed a part of ourselves and what therefore is to be feared of facts which make its relationship to us clearer? Is the proof that the safety coefficient for the kidney is identical with that of a steel bridge a disturbing fact? To me it suggests a probable relationship between vertebrate life and an inert element—a matter of deep religious import! However this may be, it is true today that the great stronghold of the metaphysical school lies in the interpretation and treatment of disorders of the mind. From having once occupied an impregnable position of complete autocracy regarding the ailments of the body, the metaphysicians have come step by step, as these have been placed by scientific study upon a natural physical basis, to occupy an insignificant position in the interpretation and treatment of bodily conditions. Not so in the domain of the mind. Here the philosophically minded modern representatives of the ancient theurgists of the Nile hold as undisputed control as did their learned progenitors. For the voice of the Virchowist who is working in psychiatry is small indeed. Perhaps it is the not far distant memory of the fate which overtook the purely philosophical interpreters of bodily disease, first at the hands of the Greeks, then of the Alexandrian school and then of Virchow, that leads this school today to resent the intrusion of modern scientific methods. The reports of the National Committee of Mental Hygiene show that, since 1880, functional insanity has increased in the United States four hundred and sixty-eight per cent while the population has increased only one hundred and twelve per cent. Metaphysical therapeutics, therefore, has signally failed.

When about five years ago Henry Cotton,* the able Director for the past twenty years of the State Hospital for the insane at Trenton, having in his efforts to do something for the insane exhausted the fields of organotherapy and heredity, turned his attention to a study of toxemia as a causative factor in mental disorder it was certainly an auspicious move. For it gave to modern surgery the opportunity to treat through the removal of hidden foci of infection patients who hitherto had been

looked upon as having nothing the matter with them physically. Amid a storm of disapproval he has conscientiously striven to show that in all so-called functional cases there is a physical basis for the disturbance of function. It has resulted, in his own words, simply in an enlargement of the toxic group long recognized and adhered to by the English writers and practitioners in spite of the rising tide of psychoanalysis. In the course of this work he has changed the nature of this great New Jersey institution from a custodial home, where seventy per cent of those who were committed to it remained to suffer and to die, into a modern hospital where, as a result of modern surgical and medical therapeutics, eighty-six per cent of the so-called functional group are discharged to their homes. When it is considered that these statistics are based upon the cold figures of a state institution; when it is known that no less than four hundred thousand dollars have been saved for the state by the introduction of these methods during the past five years; most of all, when the relief of human suffering worse than any bodily pain is considered, surely it is time that unbiased attention be given to this important matter. It is time that the profession as a whole should take a hand in the problem of the insane.

The treatment of the insane at Trenton differs fundamentally from that in vogue elsewhere in this one respect. Once it is recognized that the patient belongs to the great and rapidly increasing group of so-called functional psychotics, rather than to the senile, congenital, alcoholic or syphilitic groups, the mental phenomena are immediately relegated to the background and the physical condition of the patient is given intensive study and care. Now this simply means that he is put into a pavilion which is as nearly as possible represented by your splendid modern hospital at Roanoke. The case is approached by historical, X-ray and objective methods, just as though the patient were one suffering from so-called rheumatism, heart or kidney disorder, or any other condition now commonly known to result from focal infection. You will gather rightly from this that persons presenting a so-called functional psychosis could and should properly be treated in a general hospital. This assumption is entirely correct. For, as may be observed in the surgical wards of the State Hospital, there is little or no trouble in the administra-

*Defective Delinquent and Insane, Princeton Press, 1921.

tion of modern surgical therapeutics to this distressed group of the mentally afflicted.

The most common site for the focal infections is of course oral, while the next most common is in the cervix. In five years' duty as attending surgeon to the State Hospital, I have never yet seen a patient with the diagnosis of a so-called functional psychosis free from well-defined and generally multiple streptococcus and colon bacillus infection. Not alone are the teeth involved, sometimes those which look the best are in reality the worst, but painless osteomyelitic lesions have often extended into the body proper of the maxillary bones and in many instances into the antra. The painlessness of these focal lesions constitute their gravest menace.*

The tonsils should always be removed in a psychotic, whether pus can be expressed from them or not, because in a notable number of instances large abscesses have been found in the centre of a tonsil after removal which from the outside appeared to be perfectly normal. Less than one per cent of the group of fourteen hundred patients detoxicated by operation at the State Hospital and discharged during the past five years have been free from oral infection. Eighty per cent of all the female patients have presented infection of the cervix. A few patients among these do not have sufficient leukorrhea to annoy or distress them, so that it is important to remember that the character of the infection rather than its extent is a point worthy of careful consideration. Except when the uterus, the ovaries and the tubes are evidently damaged beyond repair, and this decision is not reached until after prolonged observation and always after the cervix has been enucleated by the Sturmdof method, the pelvic viscera are never touched in this clinic. We consider that the Sturmdof procedure is a most beneficent one. This is doubtless because it is based upon the modern understanding of the causes and of the methods of extension of gynecological disease. Briefly, this is that the infections known to be destructive to the ovaries and tubes never or almost never travel upward through the uterine canal, but always laterally through the lymphatics. Easy practical proof of this is to be obtained by any one who, on finding a mass in the pelvis, will, instead of opening the abdomen, enucleate the

compound racemose glands of the cervix and wait a matter of six months. Unless the secondary focus in the pelvic straits is of sufficient size and of such duration as to permit of its being self-continuing, the mass at the expiration of this time will usually have disappeared or have undergone sufficient recession, both in size and in tenderness, to render abdominal operation unnecessary. This infection is non-venereal.

Among the males, as reported by the late Frederick Smith,* one-third show extensive non-venereal pathology in the seminal vesicles and it is evident that in these there is also often concurrent involvement of the prostate. The treatment, therefore, of pelvic infection in the male for the purpose of relieving a psychosis is much more difficult than in the female.

Personally, having been deeply interested for more than twenty years in the problem of the cause of death in intestinal obstruction and in the vaguely understood condition now rather loosely known as gastro-intestinal toxemia, I have given most of my time at the State Hospital to this phase of the work. When the director of a hospital has reason, based upon the results of five years' study, to expect a discharge rate of over eighty per cent, he naturally begins to suspect that there is something serious the matter with a given patient who remains in the hospital beyond the average time after the usual oral, dental and cervical work has been done. Such patients should be carefully studied by the X-ray to find if there are any abnormalities, either functional or morphological, in the alimentary canal. Not infrequently there is marked delay on the left side of the colon and we have found that in many instances this is due simply to unrecognized rectal disease. A chronic folliculitis or a simple intermuscular fissure will often cause not only the left-sided delay referred to, but will actually bring about amazing interferences with gastro-duodenal function. I have repeatedly seen this to occur, not only among psychotics, but among their first cousins, the psychasthenics and neurasthenics. Nor are they "Virginia" cousins, but more closely related than at present generally believed. These unfortunates frequently fail to empty the stomach after eight hours. When it is recalled, however, that in addition to the

*Draper, J. W., Preventive Surgery, Jour. N. J. Medical Society, 1922.

*Amer. Jour. Urology, 1922.

well-known nervous equipment of the rectum there is to be added no less than five recently recognized connections of this important organ to the sympathetic system, it is not to be wondered at that profound abdominal reflexes originate there. Direct radial section in the posterior mid-line of both sphincters almost invariably restores stomach function and relieves the nervous symptoms. Again, this procedure is well within the hands of any competent surgeon; it is simply for him to get the opportunity to practice it upon the psychotic patient.

But there remains fifteen per cent of psychotics who do not improve in spite of all this minor operative procedure and of the well-recognized and vitally important treatment by vaccines and sera. These patients themselves or their parents will always give to a person qualified to ask it the characteristic surgical history of chronic intestinal disease. They have been constipated for years, often since birth; they have had chronic bilious disorder; they have had nausea, vomiting, vertigo; sick headache; they have failed in school; they have had "nervous breakdowns" or have been called "neurasthenics" for years. About twenty-three per cent of them have had the appendix removed because they presented in most instances, I believe, evidence justifying that operation. But they have not been improved. Satterlee has found a similar condition among so-called "neurasthenics." Indeed, one of the most important results of our surgical studies among the adjudged insane is the proof that in many ways the psychoses should be considered as *terminal conditions* of antecedent neurasthenia, schizophrenia, psychasthenia, nervous breakdown, etc., all of which are now known to be due to physical causes. The psychosis is often a symptom only of a general toxicosis. By the usual methods, therefore, it is as easy to determine that a given psychotic patient has a so-called right-sided surgical abdomen as would be true in the case of any other gastro-intestinal invalid. In the past five years I have removed the colon in whole or in part in three hundred cases at the State Hospital. All this mass of diseased tissue has been carefully studied and preserved in the pathological laboratory of the hospital. The lesions do not spread to the ileum via the lumen, but, if at all, through the lymphatics. There is evi-

dently a law that the lumen of a viscus does not transmit infection, as noted in the case of the uterus and also of the ureter. James Ewing, pathologist to Cornell University and consulting pathologist to the hospital laboratory, has generously given enough of his time to furnish a report upon the condition of the excised bowel. This report has been published in full. (*American Journal of Medical Sciences*, No. 3 Vol. CLXIV, p. 322). Its importance and authenticity, however, are so great that I quote from it as follows:

"I have examined sixteen specimens of colon and ileum removed at operation. The great majority of the specimens show very definite gross anatomical lesions which have resulted from chronic intestinal stasis and the ensuing chronic catarrhal inflammation. In several cases the lesions are extremely marked, in many they are well marked, while in a few there are no definite changes that can be regarded as more than minimal variations from the normal. The most marked and constant lesion is pigmentation of the mucosa . . . this is lodged in large polyhedral cells and . . . is fully recognized as a sign of chronic intestinal stasis and intoxication. It is sometimes associated with anemia and at times with severe and even fatal dystrophies of nervous and muscular tissue. Pouching of the intestinal wall from one to two cm. in depth was observed in most of the cases. The wall of the pouches was thin, the mucosa at the bottom generally eroded, sometimes ulcerated. Through such erosions and ulcerations it is obvious that absorption of fluids and bacteria readily occurred. In general the impression gained from the study of these specimens was that the clinicians were dealing with extensive and somewhat unusual grades of chronic intestinal stasis and catarrhal inflammation with its sequels. The isolation of various bacteria from the mesenteric lymph nodes does not appear to have particular significance. More important is the demonstration of hernias, pouching, thinning of wall, pigmentation and ulceration of the mucosa which together form an impressive anatomic basis for the theory of intestinal intoxication, which undoubtedly existed in severe degree in the cases exhibiting such lesions."

"Finally, I would venture to express my personal opinion that extirpation of the af-

fectured portions of the cecum and colon was justifiable and probably the only effective means of relieving the condition found in the advanced cases, while in others, with slight changes the condition could have been met by less radical means."

It is to the last paragraph of this important report that I would direct your particular attention. It voices the desire of every clinician, certainly that of every surgeon who has done a colectomy, that some tangible means must soon be found by which to recognize the presence of these destructive conditions in the colon, whether they be bands or other abnormalities and to correct them before the pathological conditions in the bowel have advanced to such a degree as to render extirpation of the cecum and colon, in Dr. Ewing's words, "justifiable, and probably the only effective means of relieving the condition." In spite of the high mortality, I have felt amply justified in creating this unique group of three hundred pathological colons removed from psychotic patients, if for no other reason than to prove that something must be done for the relief of this type of the mentally afflicted before the bowel is irreparably damaged. This should and can be done before the patient is committed, for the pre-psychotic symptoms are usually well defined. I believe that no one has contributed more sound and practical data upon this problem of prevention than Alfred S. Taylor. His work upon intra-abdominal adhesions is, and will remain, a classic.

During the past six months I have had immeasurable help and encouragement from Dr. John W. Churchman, who has taken charge of the laboratory. Not only has he inaugurated studies upon the permeability of the diseased colon and upon the practicability of using the dyes with which his name is so closely associated, but he has made a surgical analysis of the results of the last 164 colectomies, particularly in relation to mortality. It is encouraging to have the active co-operation of so highly trained and versatile a surgeon, because it gives much added confidence and certainty to this experimental surgical research. Dr. Churchman's tables will be published at a later date, but briefly they place the operative mortality at thirty-one per cent. This can undoubtedly be lowered by a further systematic study of the cause of death, but the operation will always remain a formidable one. Aside from proving a very direct relationship be-

tween the mental symptoms and the diseased bowel, the most important outcome of these studies today is that a pre-psychotic diagnosis must be made, and such preventive treatment be instituted as will save the colon from degenerating to such a degree as to necessitate colectomy. There is no *problem in medicine more pressing* than that which relates to the causation and treatment of the so-called functional psychoses. If we can take the age-old mystery out of insanity and place it upon the same practical footing as other bodily diseases, taking the good from each school, it will result in saving millions of dollars to the state and untold human suffering.

9 East Fortieth Street.

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A NEW SYSTEM OF DIETETICS IN THE LIGHT OF EUROPEAN EXPERIENCE WITH THE PROBLEM OF NUTRITION.*

By SAMUEL NEWMAN, M. D., Danville, Va.

Late Volunteer Physician, Children's Clinic, University of Vienna.

During the recent war, and the years following it, the problems of nutrition occupied a very prominent place in the minds of the European peoples. Germany, because of the effective blockade against her, was particularly concerned with the problem of nutrition from every angle. It is to be expected that just as in surgery some great lessons have been taught by the war, some lessons should also

*Read at the fifty-fourth annual meeting of the Medical Society of Virginia, in Roanoke, October 16-19, 1923.

have been taught by it in the field of nutrition. We would naturally expect to find in the German literature a summation of all our present knowledge of nutrition and practical methods for the rational feeding of large groups of people as well as individuals, as a consequence of the war and post-war experience.

Time will not permit me to bring this vast subject of nutrition even under a cursory review. I shall confine myself to a brief consideration of a few of the principles underlying a system of nutrition which was put into practice on a very extensive scale, and which I had an opportunity to study in Eastern and Central Europe as member of a Medical Commission and as a student at the Children's Clinic of the University of Vienna.

ENERGY REQUIREMENT.

Rubner¹ laid down the thesis that basal metabolism stands in relationship to body surface—not to body weight. The validity of this thesis has been recently reaffirmed by Lusk² on the basis of careful work. Rubner used the Meeh-Vierordt formula for the calculation of body surface. In this country the formula of DuBois is used, for which greater accuracy is claimed. However, in practice, because the use of formulae or charts is necessary, determinations of energy requirements are not made on the basis of surface area.

In 1914 Professor Pirquet, at the University of Vienna, began to work out a system of nutrition having as its basis quite different considerations from those enunciated by Rubner, yet incorporating his thesis that energy requirement is proportional to body surface. Pirquet discovered that in normal individuals there is a relationship between the sitting height, expressed in centimeters, to the body weight, expressed in grams. The sitting height—distance from top of head to sitting level—raised to the third power approximates ten times the body weight. Expressed in mathematical formulae, we obtain the following values:

$$Si^3 = 10 \text{ bw}$$

$$Si = \sqrt[3]{10 \text{ bw}} = 10 \text{ bw}^{-\frac{1}{3}}$$

$$Si^2 = (\sqrt[3]{10 \text{ bw}})^2 = 10 \text{ bw}^{\frac{2}{3}}$$

In the understanding of this last formula lies the core of the theory of basal energy re-

quirement. The body surface is a function of two-thirds power of its volume. A simple example will make this clear. An infant weighing seven pounds will have a basal requirement of about 200 calories per day. The question now arises, will the basal requirement of an adult weighing 140 pounds, be 20x200, or 4000 calories? Our answer is no. Why? Because body surface is not increased by simple proportion to body weight. The increase in surface of bodies of similar density is a function of the two-thirds power of their volume.

By using Pirquet's formula the basal requirement of an individual can be obtained in terms of calories, as shown by Faber³, by multiplying the square of the sitting height with 0.2 of a calory, or:

$$Si^2 \times 0.2 \text{ cal.} = \text{Basal metabolism.}$$

A person with a sitting height of 90 cms. will, therefore, have a basal requirement of $0.2 \times 90 \times 90 = 1600$ calories. The validity of this formula is established by the fact, as Faber has shown, that nearly the same values are obtained by it per meter of surface area as those of Rubner by using the Meeh-Vierordt formula.

In practice we are concerned with more than the energy requirement sufficient to cover basal metabolism. In prescribing a diet we must also provide for growth, in case of a child, and occasionally, for fat accumulation. All these values are obtained in the Pirquet system of nutrition by simple relationships to the sitting height of the individual in question. In order to be able to work with Pirquet's method, we shall have to acquaint ourselves with a new unit of nutrition which Pirquet has introduced. This unit is the value of 1 c.c. of milk of standard composition, and to which Pirquet has given the name *Nem* (Nutritionis elementum).

BIOLOGICAL VERSUS CHEMICAL VALUE OF FOODS.

In the last century, the consideration of, and the approach to, all problems of nutrition were in the light of chemistry. A great deal of valuable work has been done on the chemical analysis of foods, the work of Atwater in this country being particularly noteworthy. Soon after 1900, Fischer revealed the great variation in the composition of proteins from different sources, thereby introducing the idea of *quality* in nutrition.

The epoch making researches of Funk, McCollum and others have taught us the importance of the biological analysis of food stuffs. The splendid work on the deficiency diseases and vitamins is the result of the biological method of food analysis. The chemical analysis of a food no longer gives us a clue as to its adequacy. A food may be chemically right yet biologically wrong. McCollum rightly maintains that the practice of regarding calories as the factor of prime importance in the planning of the diet is inadequate.

The calory is a physical and chemical conception; it is expressive of the chemical era in nutrition and of the notion that heat production is the chief manifestation of life, instead of to regard heat as the by-product of vital functions, such as food intake, growth and reproduction. In place of the calory, Pirquet proposes a concrete unit which even the laity can readily visualize and with which every other food should be compared by the biologic method, a procedure now carried out in testing the adequacy of a diet with regard to the quality of protein or vitamin content.

Pirquet adopted 1 c.c. of milk (of standard composition), as the unit of nutrition. Milk, of all other foods, is physiologically best adopted to our digestive apparatus; it contains all food elements; the quality of its proteins is high; and provides for growth during the most active period of life. Milk is the most perfect physiological food. With the addition of small traces of iron, McCollum⁴ was able to maintain an omnivorous animal in a condition of normal growth and reproduction.

As a method of comparing the nutritional value of other foods with that of milk, Pirquet suggests the physiological method of substitution, instead of the chemical method of determining food values by the amount of heat they will yield by complete oxidation in the calorimeter. For example, a normal infant fed on milk would be given the food to be tested in place of a certain quantity of milk. If the infant will grow on this food, its nutritional value as compared with milk can readily be obtained.

Pirquet has thus opened up a new field of investigation in the field of nutrition. It must be admitted, however, that Pirquet and his school did not follow their own lead. His milk-unit (nem) values of food have not been worked out on the basis of physiological substitution, but were simply obtained from the

best established caloric values. Yet Pirquet's unit, the nem, is something concrete and replaces, at least for practical dietetics, the somewhat indefinite and abstract conception of the calory concerning which there arises no little confusion even among medical men. In the first place, not all of us remember, when we speak of calories, which one is meant; the large or small calory. In the second place, to speak of nutritional needs in term of calories, especially to a lay public, is like speaking of colors in terms of wave length. The fuel value of food is defined by Atwater and Kent⁵ in the following terms:

"By fuel value is meant the number of calories of heat equivalent to the energy which is assumed the body would be able to obtain from a pound of a given material, provided the nutrients of the latter were completely digested."

Besides this definition of Atwater and Kent, I shall place the Pirquet definition of *food* value, rendered into English.

"By *food* value is meant the number of milk units contained in a given food as compared with an equal weight of milk."

We thus see that in the Pirquet system of nutrition we do not go out of our element in order to seek for a definition of food value. We drop the caloric term *fuel* value, and substitute for it *food* value in its broadest physiologic significance. We shall next consider another point in the Pirquet system of nutrition, the question of the minimum protein requirement in our daily diet.

PROTEIN MINIMUM.

The optimum protein requirement of man in his daily diet has been a subject of considerable controversy. As it is well known, nitrogen or protein equilibrium may be maintained on different amounts of protein food. An excess of protein is not stored in the body but is used as an energy food. Chittenden⁶ has been the chief advocate of a low protein diet. The Swedish physiologist, Hindhede, has performed a remarkable series of practical experiments whereby he demonstrated that people may be maintained on a high level of efficiency during long periods of time on a diet made up chiefly of potatoes, which is poor in proteins. The daily protein intake of Hindhede and his associates was about 39 grams.

In times of war the question of protein in-

take is more than of mere theoretical interest. Proteins are the most expensive foods and, for the sake of economy, it becomes necessary to spare them as much as possible. The function of proteins should be limited to the rebuilding or renewal of wasted tissues in the body and not made to supply heat or energy, as it happens when an excess of it is taken. Schick⁷ well said that it is as rational to use the expensive animal proteins for the purpose of supplying body heat as it would be to use window frames, doors, and piano wood for the purpose of heating our stoves. Yet, on the other hand, it is important not to go below the protein minimum. Without sufficient proteins in our food to cover tissue waste and body growth, in children, national efficiency will soon be undermined.

The question of protein minimum is very important also from the clinical standpoint. Clinicians believe that the consumption of proteins above the optimum is not only an unnecessary luxury but also a harmful habit. The excess of protein is a harmful load on the kidney. The caloric value of 1 gram of protein in the calorimeter is 5.7 large calories. The oxidizable value of protein in the human body is about 4 calories. The non-oxidizable part of the protein molecule must then be excreted by the kidneys. A B. Macallum⁸, in discussing recently the question of the intestinal mucosa as a portal to disease, calls our attention to the possible effect of proteins on another organ than the kidneys. Macallum makes the following significant remarks:

"It is probable that excess in diet, especially in its protein constituents, may task the capacities of the epithelial cells and diminish their power to react normally, with the result that they allow to pass through them, and to the underlying tissues and the circulation, the products of intestinal putrefaction, which in their healthy vigorous condition they do not permit to enter them. This would explain some of the pathological results of a high protein diet."

A. B. Macallum, then, takes for granted the injurious effect of a high protein diet from a bacteriological standpoint. In accordance with the older theory that the intestinal lining is synthesizing the amino acids which were formed in the process of digestion into body proteins, it is readily understood how an ex-

cess of proteins in the foods will overwork and exhaust the intestinal cells.

In the Pirquet system of nutrition the protein minimum is taken to equal ten per cent of the total caloric value per day. An adult with a caloric requirement of 3,000 would need 300 calories in proteins, or 75 grams of proteins. Pirquet does not state the protein requirement in absolute figures. He only says that whatever quantity of food one consumes the protein minimum should be ten per cent of the total caloric value. This idea seems very reasonable, since, as we know, the utilization of body proteins will vary with the amount of total food taken. If larger quantities of food are consumed, more secretions will be necessary and a proportionate larger tissue waste will result. The basis for the protein minimum in Pirquet's system of nutrition is human milk. Standard human milk has 1.7 per cent protein. One gram of protein yields 4 calories, or 6 nems. One hundred c.c. of milk will therefore have 10 nems in protein value.

Time will not permit me to discuss one more point in the Pirquet system of nutrition, that of food concentration. By food concentration is meant the relation of food value to weight, or $\frac{\text{food value}}{\text{weight}}$. Internists and pediatricians

are fully aware of the importance for the clinic of the subject of food concentration. As much as the subject of food concentration is of extreme importance in dieto-therapy it never rested upon a rational system. For instance, when one reads about thick cereal feeding in cases of pylorospasm he is never sure of the caloric value of the cereal per unit of volume or weight. Pirquet introduced system into this subject by adopting a logical standard of food concentration. Any food which contains 1,000 nems (milk units) in one liter of volume, or kilo of mass, is called *equal* food. This means it is equal in concentration with the natural food, milk, which also has 1,000 nems in a volume of one liter. I will not dwell longer on this point, yet I have shown how Pirquet standardizes and rationalizes the whole subject of dietetics.

I shall now summarize the main points in this paper and will demonstrate the actual working of this system of nutrition from my own cases. This system is not diet-kitchen play but daily life through many years in the great Children's Clinic of the University of Vienna.

The feeding program of hundreds of thousands of children in Europe was carried out in accordance with this system, and with most magnificent results. Personally, I had experience with this system for more than two years and with most gratifying results.

SUMMARY.

1. One c.c. of milk is the unit of nutrition. This is called *nem* and is equal to $2/3$ of a calory.

2. The nutritional requirement of every individual can be obtained from his sitting height.

3. Minimum, optimum, and maximum requirements can easily be obtained in terms of milk units by simple relationships to the square of the sitting height.

4. The relationships of food value to food weight are standardized and designated by a logical terminology.

5. This system of nutrition is the basis of the Vienna pediatric school and enjoyed a trial and successful application on the most extensive scale.

ILLUSTRATIVE CASES.

CASE 1.—W. M., boy, nineteen weeks old. Full term, forceps case. Birth weight: 8.75 pounds. Artificially fed since second week. Present weight: 7 pounds, 10 ounces. Per cent underweight: 45. Diagnosis: Athrepsia; decomposition; and capillary bronchitis.

Treatment: The sitting height of the baby is 35. 0.3 of the sitting height squared (3den. siqua) is the minimum food requirement of the child. It was started with this minimum. The baby retained the food. On the following day I added 2den. siqua; that is 5den. siqua have been given ($35 \times 35 \times 0.5 = 600$ nems—or 6 hectonems). The food concentration was that of whole milk. The food was gradually increased, taking the maximum (35×35 n) after two weeks of treatment. Together with the increased nem, or caloric, intake the concentration of the food has also been increased; that is, more calories and lesser volume. In five weeks the child gained 5 pounds and 3 ounces, the percentage of underweight being only 14. Throughout these five weeks the protein intake did not exceed 10 per cent. A normal child should have gained during the same period at the same age 24 ounces. Our patient gained

83 ounces. This atrophic infant has manifested a "living potential" of 3.45×24 .

CASE 2.—F. A., boy, thirty-one weeks old. Premature, forceps delivery. Birth weight: 5 pounds. Artificially fed since birth. Present weight: 7 pounds, 10 ounces. Percentage of underweight: 43.5. Diagnosis: Athrepsia and acute intestinal intoxication.

Treatment: Sitting height of infant is 36. The first day only the minimum was given. On the following day 5den. siqua ($36 \times 36 \times 0.5$) were given. At the end of the second week the food intake had been increased to 8.5den. siqua. The food concentration was $3/2$; that is 1,000 calories (1,500n) are contained in one liter (1 and $1/2$ times the concentration of milk). In three weeks the child gained 34 ounces (2 pounds and 2 ounces.)

The ingredients of the food formulae in both these cases consisted of whole cow's milk; Mead's Dextri-Maltose; a few grams of barley flour; and water.

CASE 3.—B. L. C., girl, six years and seven months old. Diagnosis: 20 per cent underweight due to faulty food habits. Treatment: The sitting height of the girl is 61 cms. She has been given a diet of 5den. siqua. ($61 \times 61 \times 0.5 =$ nearly 2,000 nems). The diet was made up of special articles with the idea of assuring myself that the patient should eat in excess of the diet. From August 14th to October 2nd of this year the patient gained 10.5 pounds. The normal gain for a period of six weeks at that age is about 9 ounces. The girl therefore gained $\frac{168 \text{ ounces}}{9} = 17.5 \times$ normal gain.

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DIARRHOEA IN INFANTS.*

By ST. GEO. T. GRINNAN, M. D., Richmond, Va.

The large mortality caused by diarrhoea in infants is an important field for preventive medicine. Many mothers have lost the first child from diarrhoeal trouble and a life was sacrificed in order to educate her to save those that came later. While there is much to be learned in the prevention and treatment of diarrhoea in infants, valuable information has been acquired. Diarrhoea is still one of the largest causes of death in infants under two years of age. The disease is largely preventable. The various departments of public health have done very valuable work in instruction of mothers, and making milk safer.

Diarrhoea in infants is the result of several causes. The classification most commonly used now is infection, fermentative and mechanical. Diarrhoea is not common in breast fed infants. In the case of breast fed infants diarrhoea is almost certainly infectious and not fermentative. Some obstetricians give an infant six per cent solution of sugar water while waiting for milk to come in the mother's breast. This is a bad habit. Plain water and not sugar water should be given. The habit of giving any purgative to a new born infant is dangerous. A purgative is often used in *icterus neonatorum* with only harmful results.

I know one physician who lost his first two children before he learned to remove from the breast an infant suffering from breast milk infection. In breast milk infection there is often very little diarrhoea.

Here in Virginia infectious diarrhoea begins about the middle of May and is prevalent until September. A smaller number of cases are seen in the colder months. It is a very safe plan to have all milk boiled for an infant under eighteen months of age from May 15th to September 15th. During this period antiscorbutics can be given, and heliotherapy used, as an anti-rachitic.

Probably the most common cause of diarrhoea in infants is intestinal fermentation caused by excess of sugar. The products of fermentation irritate the intestinal mucosa but the mucous membrane is not attacked by the bacteria. (Practical Infant Feeding by Hill page 296.)

Under normal conditions the small intestine

is fairly sterile. The child can only absorb a certain amount of sugar and, when an excess is given, it passes into the intestine and ferments. Overheating of the body from hot weather or too much clothing are important causes of fermentation.

Infected milk is also a cause of sugar fermentation. The fermentation of sugar produces acids which irritate the mucosa and cause diarrhoea. Acetic acid is a common product of sugar fermentation in the intestine by bacteria. Other acids such as formic and butyric are also formed. Acetic acid is very irritating and the mucosa is injured, this injury reduces the anti-bacterial function, permitting harmful bacteria to pass into the circulation. It will be remembered that acetic acid is used to remove warts and corns.

There are various degrees of this condition; season may or may not be a factor.

In mild cases omission or reduction of sugar will cure the case. A purgative is not necessary. If the case has fever and there is no diarrhoea, a purgative is necessary. No food is given but barley gruel for twelve or twenty-four hours. One grain of saccharin to the pint of barley gruel will make it palatable. Sugar should be omitted for one day and sometimes longer, rarely over three days.

For the past six or seven years I have used protein milk in fermentation cases of diarrhoea. The high protein tends to make the intestine alkaline. Two purposes are thus obtained, the intestine is rendered alkaline or the acidity reduced, and the alkali reserve of the body which has been heavily drawn upon is restored. Thus acidosis which is usually present is checked and the irritating acid in the intestine neutralized. Protein milk can be used with breast milk, with barley gruel or skimmed milk. Finkelstein's formula was made with lactic acid milk. Some pediatricians have adopted the lactic acid milk and use little protein milk in the lactic acid milk. Protein milk can be bought on the market and it is quite easily made at home. A very serviceable preparation can be made in two hours. I have had it made in the homes of rich and poor, and in hospitals, for years. It is prepared as follows: Three junket tablets or three teaspoonfuls of essence of pepsin are added to one quart of milk; keep at a temperature of 100° F. for 30 minutes; break up the clot and strain in cheese cloth or fine wire sieve.

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It is best to let it strain for an hour and safer to let it strain in a refrigerator. The curd is rubbed through the sieve several times in order to insure fine division of the casein. This casein powder can be used in barley gruel or skimmed milk; it is more commonly used in fat free lactic acid milk. The amount of protein milk or casein obtained from one quart is 5 or 6 ounces. To this is added one pint of fat free lactic acid milk and enough water to make one quart. This will give low sugar 1.5 per cent, high protein 3.5 per cent, fat 2.5 per cent.

Unless some sugar is used acidosis may result. For the first day of treatment, saccharine may be used to make the protein palatable, the second day enough sugar to make a 3 per cent sugar, gradually increasing to 6 per cent. As the case improves, protein milk is not needed longer than one week or ten days.

Lactic acid milk suits a large number of these cases. If lactic milk cannot be obtained, skimmed milk can be used. It is worth while making the lactic acid milk as it is superior to any other milk product in the gas bacillus cases. It is made in twenty-four hours by inoculation with lactic acid bacillus. The milk should be previously boiled to kill other bacteria. Marriott, of St. Louis, has had marked success with lactic acid milk and Karo syrup.

Colonic irrigation is used in many cases more than is desirable. One irrigation may be used early in the disease but rarely later in the disease.

Owing to great loss of fluid in diarrhoea, water has to be given in large amounts. In many cases of extreme dehydration, intraperitoneal saline solution is a valuable means of restoring fluid. Physiologic saline solution is used at a temperature of 100° F. One teaspoonful of salt to one pint of water gives the normal solution; 100 to 300 c.c. can be given at a time, according to the size of the baby. It can be repeated in twelve or twenty-four hours. Rarely is it necessary to give more than three injections. As an alkali, precipitated chalk is more valuable than the soluble soda which is largely absorbed in the stomach. I rarely use either bismuth or opium in diarrhoea.

Infectious diarrhoea presents a different problem. Here we have protein putrefaction which is more dangerous than sugar fermentation. The dysentery bacillus is the usual cause though other bacteria are found. Un-

clean milk is the common cause. Failure to wash the breast before and after nursing is a cause in cases occurring while breast fed.

Infectious diarrhoea can be started by fermentative diarrhoea. This disease is infectious and can be transferred by soiled napkins, "fingers, food and flies."

The stools are usually alkaline and are not especially offensive in odor. Blood is common in the stools of infectious diarrhoea, while more pus is seen than in fermentative diarrhoea. The treatment of this form of diarrhoea is different from the diarrhoea caused by infections. An initial purgative is usually required. This should be a smooth purgative such as castor oil. It is rare to have to repeat the purgative. Constant purgation is not safe. One dose of castor oil will often produce blood seen by microscope, and calomel will produce mucus and blood in the stool of a healthy child.

All food is to be withdrawn for twelve or eighteen hours. Water is given every hour. After the starvation, an eight per cent sugar solution in barley gruel is given for one or two days. Dextri-Maltose is a good sugar to use. Milk is then given in diluted form. Skimmed milk or fat free lactic acid milk is used, the protein and fat kept low. Barley gruel is a good diluent, beginning with 1/3 or 1/4 milk.

The gas bacillus type of infection presents a problem of feeding different from the infectious type. In this type the treatment is more like the treatment of fermentative diarrhoea; a low sugar and high protein is used. The gas bacillus will thrive on a high sugar but does not thrive on protein. The lactic acid milk is excellent for gas bacillus diarrhoea cases. In this class the protein lactic acid milk excels. Saccharine can be used for the first one or two days, then lactose not over 4 per cent, gradually increasing as the patient improves. During the first day of starvation a simple test will determine whether the case is infectious or gas bacillus. If a small quantity of milk is boiled and put into a glass tube with some of the bowel movement, the milk will coagulate and have holes in it like cheese and smell rancid. For vomiting I have found stomach washing with a solution of bicarbonate of soda superior to any other treatment. Mechanical diarrhoea is usually in the older child and is due to eating heavy coarse food, especially fruit. Vomiting is usually severe.

Purgation is necessary; no food except water should be given. If acidosis occurs from excessive vomiting, soda bicarbonate can be given by bowel, 6 per cent solution, a pinch of starch being used to prevent irritation. Lactose solution can soon be given in these cases.

I have tried to point out the necessity of classifying diarrhoea in infants as the treatment depends entirely on the cause of the diarrhoea.

DISCUSSION.

DR. SAMUEL NEWMAN, Danville, Va.: I wish to ask if Dr. Grinnan uses seventeen per cent (17%) sugar solution with new-born babies, as Schick recommends, to prevent loss of weight.

DR. GRINNAN, closing: Fifteen per cent is often used in cases of dehydrated children; three times the caloric value is sometimes essential.

925 West Grace Street.

THE USE OF GLUCOSE PER RECTUM IN THE FIRST STAGE OF LABOR.*

By M. PIERCE RUCKER, M. D., Richmond, Va.

Glucose therapy has recently had a prominent place in the treatment of eclampsia and the toxemias of pregnancy. Titus¹ has shown that the liver cells are quickly depleted of glycogen in toxemia and that a depleted liver cell is inactive so far as its detoxicating function is concerned. This is in accord with the previous experimental work of Opie,² Whipple³ and others, upon animals. The St. Louis investigators used phosphorus and chloroform as poisons and rats as laboratory animals. The California workers used chloroform and dogs. It was found that a carbohydrate diet not only had a marked effect in protecting the liver against the toxic effect of the drugs, but also hastened the repair of the liver necrosis in a very remarkable manner. We know that, whatever the nature and origin of the toxin or toxins of eclampsia may be, the action upon the liver is the same as that of chloroform. Titus' work would indicate that glucose has the same power of protection against the action of the toxins of pregnancy as it does in the case of chloroform poisoning. He recommends either intravenous, rectal, or oral administration, according to the severity and the acuteness of the toxemia.

Following Titus' work, I have used glucose as he suggested, in a number of toxic cases at or near term, in which induction of labor

was deemed advisable. I was impressed with the shortness of the first stage of labor as compared with previous similar cases in which glucose was not used. I therefore extended the use of proctoclysis with glucose solution to my non-toxic cases with gratifying results. The first stage was greatly shortened and the patients finished their labors strong and refreshed. This was especially noticeable in several patients seen in consultation, who had become worn out by a long tedious dilating stage.

Impressions, however, are very poor material for a medical paper. In order to have something to back up my impressions, and to be able to give you some tangible facts, I have gone over all my normal cases in which I have induced labor with bags and used glucose per rectum. The use of bags at term gives a more uniform result, especially in regard to the length of the dilating stage, than is the case with spontaneous labor. Both precipitous and long tedious labors are eliminated. In the language of the statistician, the coefficient of deviation is smaller. In a previous paper⁴ before this society, I presented my results with bags and version at term. At that time, I found the average duration of labor, estimated from the time the bag was placed until the expulsion of the afterbirth, to be 13.68 hours for primiparas and 7.88 hours for multiparas. In the present series, the cases were handled in the same manner except that the patients were given a proctoclysis with five per cent glucose solution as soon as the bag was placed and the proctoclysis was kept up until the dilatation of the cervix was complete. Nothing was given by mouth during this time. The amount of hyoscin used was approximately the same in the two series. Usually, as in the former series, the bag was weighted until the patient began to have pains. However in a number of cases, especially in the multiparas, the dilatation was so rapid, that there was danger of having the delivery too close to the initial dose of morphin. In many of these cases where the softness of the cervix led me to believe that the dilatation would be rapid, the weighting of the bag was left off entirely.

I have used glucose in this manner with bags and version at term in fifty-four non-toxic cases. There were twenty-seven primiparas and twenty-seven multiparas. One of the multiparas had a funnel pelvis and her previous

*Read at fifty-fourth annual meeting of Medical Society of Virginia, in Roanoke, October 16-19, 1923.

labor was unusually long and tedious on account of inefficient uterine contractions. Another was so nervous and rebellious that she got practically no glucose. Her labor lasted 11 hours and 55 minutes. Two of the primiparas belonged to the funnel pelvis class, and their labors lasted just the same time, i. e. 15 hours and 15 minutes. The average duration for the primiparas was 7 hours and 52 minutes, the extremes being 3 hours and 30 minutes and 15 hours and 15 minutes. The average duration for the multiparas was 6 hours and 18 minutes, the extremes being 2 hours and 20 minutes and 12 hours and 15 minutes (the funnel pelvis case).

If the patient is in a hospital, the glucose is administered in a five per cent solution by the drop method. If I have not the facilities of a hospital, I vary the technic somewhat. When glucose is not at hand, a satisfactory solution can be made by dissolving a teaspoonful of Karo syrup in a pint of hot water. A gill of this can be given per rectum every hour, the patient being instructed to retain it.

MODE OF ACTION

To what are we to ascribe these very definite clinical results? At first I was of the opinion that the action of moisture and heat upon the uterus, causing the cervix to relax and the fundus to contract more vigorously, was the chief factor. Murray⁵ as far back as 1886 demonstrated that both heat (115° F.) and cold (60° F.) had a marked and immediate effect on the uterus, causing it to contract vigorously. The beneficial effect of hot enemas upon a lagging uterus has long been a common clinical observation. Recently there has appeared a very interesting book upon obstetric physiology by Vignes.⁶ This author classifies sugar as an oxytocic. He is of the opinion that its ecboic action is seen only after labor is well advanced and intimates that it is due to its energy supplying effect. Bossi⁷ in 1893 described the ecboic action of sugar in cases of inertia, and reported eleven cases. He used 30 grams of glucose in 200 c.c. of water.

It would be interesting to determine just how much benefit is due to heat, how much to fluid, and how much to the glucose. Perhaps at some future time I will be able to properly evaluate these three factors. At this time, however, I am presenting a practical paper

and such theoretical considerations do not now concern us. The practical point is that, in the administration of glucose per rectum, we have a means of shortening the first stage of labor and of supplying the patient with much needed energy.

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Medical Arts Building.

CHRONIC OCCLUSION OF THE DUODENUM IN VISCEROPTOSIS; BASED ON A STUDY OF TWENTY-EIGHT CASES.*

By DOUGLAS VANDERHOOF, M. D.,
and
T. DEWEY DAVIS, M. D.,
Richmond, Va.

The possibility of chronic obstruction to the duodenum where it is crossed by the root of the mesentery has been recognized for many years. Glenard,¹ in 1889, and Kundrat,² in 1891, called attention to the fact that persistent, partial constriction of the duodenum at

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this point was not an infrequent occurrence. In 1907, Conner³ suggested this obstruction as an etiological factor in acute dilatation of the stomach. VanderHoof,⁴ in 1917, reviewed the literature on the subject of dilated duodenum secondary to chronic arteriomesenteric occlusion and reported six typical cases. Since that time articles and case reports dealing with this condition have been published by a number of observers, among them Crouse⁵ and E. L. and W. A. Kellogg^{6, 7} in this country, and Hartmann,⁸ Romme,⁹ Ranzel¹⁰ and Hurst¹¹ in the foreign literature. Chronic occlusion of the duodenum has become recognized as a clinical entity and its treatment has been placed on a sound anatomical and physiological basis.

The duodenum is normally slightly constricted where it is crossed by the root of the mesentery and its accompanying vessels. This was shown by Albrecht,¹² in the cadaver, and has since been confirmed by a number of investigators. The aorta and vertebral column just posterior to this point form an unyielding surface which acts like one lever of a nut-cracker. Anteriorly, the firm mesenteric vessels supply the other lever. Between these jaws passes the soft, compressible duodenum. It is obvious that any unprotected downward drag on the mesentery and its contained vessels will tend to close these levers. This is exactly what happens in the viscerototic patient. But if there are deposits of fat in the mesentery and behind the parietal peritoneum, these bear the brunt of the pressure, and the closure of the jaws will be prevented. However, in the thin individual, these pads are lacking, leaving nothing to prevent the duodenum from being compressed. In addition, if the posterior lever of the nut-cracker is thrown forward, as is the case in increased lordosis of the lumbar spine, the chances of obstruction are necessarily much increased. This fact was brought out by Schnitzler,¹³ and further emphasized by VanderHoof, one of whose patients showed the condition to a marked degree. The latter also called attention to the fact that in extreme visceroptosis where the intestinal coils rest on the pelvic floor there is less chance of dragging on the mesentery with its accompanying duodenal compression.

Bloodgood¹⁴ and Jordan¹⁵ suggested that in ileal stasis and constipation the increased weight of the terminal ileum and proximal

colon tends to enhance the downward pull. The Kelloggs⁷ advance this theory as the explanation of certain so-called bilious attacks in which the patient complains of severe constipation with nausea and the vomiting of bile, relieved by a laxative.

Another etiological factor in the condition is the perpendicular course of the jejunum in visceroptosis rather than the normal outward curve into the left renal fossa (Crouse⁵). This would increase the duodeno-jejunal angle, making the obstruction more complete.

Since VanderHoof's article appeared in 1917, twenty-two additional cases of dilated duodenum have come under our observation, and the whole series of twenty-eight cases of chronic duodenal occlusion has been studied with regard to the symptomatology and diagnosis of this affection. The result of treatment has been followed in a number of these patients with striking relief of troublesome, often serious, symptoms.

The clinical features of chronic duodenal occlusion are conveniently grouped under the following heads:

1. **VOMITING.** Persistent, or recurring vomiting is present in the majority of cases. This is generally associated with nausea, but in other cases there is simple regurgitation of food or actual rumination. Owing to the fact that the duodenal obstruction is infrapapillary, that is, below the entrance of the common bile duct, the vomited material is often tinged with bile. The regurgitation or the vomiting begins very soon after the meal is eaten. It is differentiated from the vomiting due to occlusion at the cardiac or pyloric ends of the stomach by the fact that in cardiospasm there is apt to be a definite difficulty in swallowing, while in pylorospasm vomiting is most apt to occur at the height of digestion, two to four hours after the meal.

Persistent vomiting may result in acidosis and death of the patient. Finney¹⁶ and Bloodgood¹⁴ have each reported fatal cases of dilated duodenum with a patent condition of the pylorus, and one of VanderHoof's early cases came to necropsy with typical arteriomesenteric occlusion and greatly dilated duodenum.

In other instances, rather frequent vomiting may occur without giving rise to any serious results over a period of some months. Under such circumstances the condition is often misinterpreted and thought to be a functional dis-

turbance or a neurosis. Many such cases of supposed "hysterical vomiting" have been completely relieved by rest-cures and forced feeding by physicians who attributed the splendid results to psychotherapy, and who failed to recognize the relief of the mechanical obstruction brought about by the posture and the increase of body fat.

2. PAIN. Epigastric distress or pain is a common complaint, and is often associated with flatulence and a sense of fullness. It is often described as an aching or dragging pain. In quite a few instances, however, the pain may be acute and referred to the lower right costal border. In such instances the condition is often mistaken for gall-bladder disease. Occasionally the pain simulates that occurring in peptic ulcer. It has been stated by a few authors that chronic duodenal obstruction favors the occurrence of duodenal ulcer. This complication did appear in one of our twenty-eight cases.

3. CONSTIPATION. Obstinate constipation occurs in the majority of cases, while in a few instances the bowels are entirely regular. The stools show nothing abnormal.

4. UNDERNUTRITION. Patients with chronic duodenal obstruction are always below weight for their height. Many of them have lost weight, others have always been thin. The "habitus enteroptoticus" is indelibly stamped upon these cases, and this may be associated with exaggerated lordosis of the lumbar spine.

5. SEX AND AGE. The majority of cases occur in young women. In our twenty-eight cases there were twenty females and eight males. The youngest patient was a girl of 15 years, the oldest patient was a woman of 62 years. Sixteen of our cases were between the ages of 15 and 35 when they came under observation. It should be noted, however, that the condition is essentially chronic and in many instances the symptoms date back over a period of several years.

6. GENERAL SYMPTOMS. Vague toxic symptoms are very common. The patients generally complain of weakness and exhibit signs of an unstable nervous make-up. Headache is frequent.

Physical examination in these cases reveals but little. The thin, visceroptotic type of individual with an acute costal angle and relaxed abdominal walls is observed. Occasionally there is some tenderness in the epigastrium, and

at times a sense of resistance is felt above and to the right of the umbilicus.

Careful gastro-intestinal X-ray studies with good technique and vigorous manipulation in the attempt to completely fill the dilated duodenum confirms the diagnosis in practically every case. Occasionally a very extraordinary fluoroscopic appearance is observed, as was described by Jordan¹⁵ in one of his patients with hugely dilated duodenum. It should be remembered, however, that the condition is often periodic, and examination when the patient is free from symptoms may fail to disclose any abnormality. This point has been recently emphasized by Hurst.¹¹

The treatment of the condition is preferably medical but, if this is unsuccessful or inadvisable, resort to surgery is indicated. The medical treatment is chiefly mechanical and directed toward opening the "levers" to which reference has been made above. Since little can be done to change the posterior lever, our attention is naturally centered on the more mobile anterior one. Could we actually reverse the normal position of the body for sometime after each meal, the compression would obviously be relieved, but this is impracticable. Therefore, we resort to a modification of this posture.

In the beginning, until the patient falls into the routine, hospital treatment is advisable. The first essential is bed rest and the value of the prone posture is further enhanced by elevating the foot of the bed eight to twelve inches, and by instructing the patient to lie on his face as much of the time as possible. One hour after each meal the patient assumes the knee-chest posture for a period of twenty minutes. Immediately after this the patient goes through a set of two exercises. The patient lies flat on his back and comes to the sitting posture without the aid of the arms an increasing number of times. Alternating with this he raises the legs up to a right angle with the prone body. These exercises are gradually increased in number until each is done fifty times after each meal. In addition, the patient receives daily general massage with special attention to the abdominal muscles.

A vigorous attempt should be made to control the constipation which has been shown to be a possible etiological factor. Strong purgatives should be avoided as they only increase the difficulty in the end. The intelligent use of bran and mineral oil with plenty of water,

drinking a pint of water before breakfast and between meals, will usually prove efficacious.

At the same time every effort should be made to increase the deposit of mesenteric fat, else little will be accomplished. A general diet is given of good nutritious food especially rich in fats and carbohydrates. In addition, nourishment between meals and at bedtime is ordered. If the appetite is not satisfactory, simple tonics may be prescribed. For some months after the period of active treatment it is best that the patient sleep with the foot of the bed elevated, lie down one hour after meals, and continue the forced feeding.

The postural treatment of arteriomesenteric occlusion of the duodenum, with exercises and massage to strengthen the abdominal walls, supplemented by forced feeding and increase of body weight, will bring about complete relief of the condition in the vast majority of cases. So satisfactory have been our results that we look upon the above procedure as a therapeutic test and, if the response to medical treatment is not prompt and progressive, we are apt to feel that we are not dealing with an uncomplicated instance of this affection. In an occasional case, however, after the attempt at medical treatment has failed, surgical relief may be indicated. It should be recognized that gastro-enterostomy does not relieve these patients. The operation of duodeno-jejunosomy was first done for this condition by Stavelly,¹⁷ in 1910, with complete success, and similarly good results from this procedure have been since reported by the Kelloggs.⁷

CONCLUSIONS.

Duodenal occlusion from compression of the third portion of the duodenum by the mesentery and its contained vessels is a definite clinical entity.

This condition is not infrequent in instances of visceroptosis, owing to increased drag on the mesentery.

Arteriomesenteric occlusion of the duodenum brings about a dilatation of the duodenum proximal to the compressed point, and is followed by a train of characteristic symptoms, the most prominent being persistent or recurring vomiting and epigastric pain.

The probability of chronic duodenal occlusion should be suspected in every thin, visceroptotic individual complaining of chronic "indigestion" with nausea and vomiting. The

diagnosis is confirmed by competent X-ray examination after a barium meal, with appreciation of the fact that the degree of occlusion and dilatation of the duodenum may vary in the same individual at different times.

Postural treatment with increase of body weight (deposition of fat in the peritoneal tissues) brings about complete relief of this malady in almost all cases. In an occasional instance a properly performed duodeno-jejunosomy is indicated and is also followed by most satisfactory results.

Professional Building.

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METABOLIC EMBOLISM, REPORT OF A CASE.*

By J. N. UPSHUR, M. D., Richmond, Va.

Mrs. B. age 46. Previous history: Reared in an orphan asylum, which she left at 18 years of age. No serious disease prior to fatal illness. Was attended by the writer while in the asylum. Was lost sight of for two or three years after leaving the asylum. When called to see her, she had been several months in bed, examination revealed a large abscess in the left side of the pelvis. Went to hospital for operation, but under the influence of hot douches and tampons of ichthyol and glycerine, the abscess ruptured, and she made a complete recovery. For several years she only had transient indispositions. At rare intervals had slight endometritis. Was married at twenty,

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but continued the immoral life which she had previously led. The abscess previously mentioned was from gonorrheal infection. With one of her paramours she continued her association up to the time of her death. For several years, he was the subject of locomotor ataxia. She was a large woman, weighing 245 lbs. She consulted the writer April 19th. She had slight menorrhagia, which was controlled after five applications of a twenty-five per cent solution of argyrol. On the morning of April 24th, at 2 A. M., she was awakened by an acute abdominal pain; the writer was called at 9 A. M. and saw her an hour later. She was lying on her back, abdomen distended, tender and tympanitic, persistent nausea, and bowels relaxed. Gave a hypodermic of morphia gr. $\frac{1}{4}$ and atropine $\frac{1}{150}$. Was seen at 2 P. M. at which time pain had centered in the lower right quadrant of the abdomen and all of the cardinal symptoms of appendicitis were present. Was seen at 3 P. M. by Dr. Bryan in consultation, who agreed with the writer as to diagnosis and the immediately critical condition demanding prompt surgical interference. She was removed to Grace Hospital, and at operation the following condition found as reported by Dr. Bryan. "The leucocytes were 13,000, no urinalysis was made. The abdomen was tender and rigid throughout, particularly in the lower quadrants, temperature 103, pulse 90. General anaesthetic, ether, drop method, administered by Dr. Willis, assisted by Dr. Creekmur. We decided upon the right rectus, which was generously made on account of the large amount of subcutaneous fat. The peritoneal cavity was cautiously entered and there was an immediate flow of serous bearing flakes of lymph, almost purulent but with no odour. Those intestines presenting proved to be on eviceration the loops of the small intestine, some four or five feet above the ileocecal valve. They were intensely red, strawberry colored, with innumerable small patchial hemorrhagic spots so closely put together that the whole presented red color, and congestion extended likewise in the mesentery which was elongated, thickened and greatly edematous, almost brawny, with bluish-grayish spots here and there which would indicate a possible breaking down. The condition stopped rather abruptly at about five feet from the caput proximally and likewise only a few inches from the caput distally; the omentum had

apparently become attached to this large distended edematous loop and was violently red and inflamed, there being here and there hemorrhagic cysts, one or two of which were the size of a robin's egg each. There were likewise multiple subperitoneal fibroids over the fundus of the uterus, probably fifteen or more, none of them larger than a malaga grape and many the size of a small hazel nut. The appendix was located with considerable difficulty due to the short colonic mesentery and was found to be bound down by adhesions. It was fibrous, atrophic, hard and small and we did not attempt to remove it. Investigation of the upper abdominal cavity showed the gall bladder and liver to be normal and there were no evidences of a duodenal ulcer. The right and left kidneys were not palpated, but there was a distinct thickness and heaviness of the head of the pancreas, but I do not know that this has any particular bearing on the case. A large rubber catheter was placed in the pelvis about Douglas' cul-de-sac and twenty ounces of saline solution injected with a large syringe into the peritoneal cavity for attenuation of the peritoneal fluid and a spiral cut rubber tube bearing a strip of iodoform gauze was placed deep in the pelvis and brought out at the lower angle of the wound. Tissues were brought together in layers with catgut No. 2, silkworm gut, through the skin. Duration of the operation 50 minutes.

Remarks: I believe the case to be one of thrombosis of the mesenteric vessels and more pronounced evidences of the terminal stage would have been gangrene of the loop to which we above referred. It may be that our operation was of some benefit as gangrene is not always a sequel of hemorrhagic infarct. We did not consider the pathology sufficient for resection. She took up three quarts of water that night by proctoclysis, her temperature next morning was 101, her kidneys acting well and her condition more favorable than during the operation."

April 27, 1923. Her condition was so grave that a secondary operation was deemed necessary, as giving her the only chance for life. "The old silkworm gut sutures were cut and removed, tissues were easily broken through with the finger, the peritoneal cavity readily entered. There was a considerable amount of seropurulent exudate which by gravity found its way to the pelvis, also considerable plastic

lymph, organized exudate binding the intestines together. The small intestines are greatly ballooned, their walls thickened and red, no attempt was made for an extensive investigation of the peritoneal cavity and organs, and one of the large distended loops of the small intestine was brought into the wound, catgut approximating the peritoneum and deeper layers, the skin was then sewn together with silkworm gut with this large loop hanging well out from the abdomen; purse string suture was then put about the free border of the gut, puncture made, considerable gas and fluid escaping, and a large fenestrated rubber tube shoved into the proximal loop some four or five inches, purse string suture pulled together to hold the tube in place, vaseline put over the intestine and about the wound, copious dressings. It is evidently a paresis throughout, the character of the peritoneal exudate indicates a severe state of septic peritonitis, and the prognosis, of course, is most grave."

She died early the morning of April 28th.

Remarks.—It is very singular that, with the extensive pathologic condition in her abdomen, she had no symptom of digestive disturbance and, on the morning prior to her seizure, she was at my office and expressed herself as "feeling fine." There was never any reason in this case for a Wassermann, but her well known immoral life and the locomotor ataxia of her paramour (who has since her death also died) and conditions found at operation give strong suggestion that syphilitic infection was causative of her trouble.

In the VIRGINIA MEDICAL MONTHLY for April, 1923, Dr. Stuart McGuire reports two cases in a paper read at the fifty-third meeting of the Medical Society of Virginia. In neither of his cases was a diagnosis made prior to operation; in one of his cases seven feet, four inches of the bowel was removed, in the other case four feet, six inches; both of these cases recovered. The success in these cases is a tribute to Dr. McGuire's good surgical judgment and operative skill. In the discussion, Dr. Horsley emphasized the importance of the removal of a sufficient amount of bowel, saying that he had lost a case he thought from failure to do this. It was emphasized that agonizing abdominal pain with symptoms of shock are very significant symptoms. In the case reported in this paper, there was intense pain, temperature 103 F., but no evidence of shock.

Dr. McGuire emphasizes the fact that the mortality in these cases (92.5 per cent) should be largely reduced by early recognition and prompt operation. But the symptoms so closely resemble those of fulminant appendicitis, that a differential diagnosis is rendered difficult. The urgency of a prompt operation is emphasized in either case. At the same meeting of the State Medical Society Dr. Tankersley, of Greensboro, N. C., reported three cases. His cases occurred following operation. The first case, five days after operation for appendicitis, the second, "somewhat similar," six days after operation for appendicitis developed acute pain in the right iliac, profound shock, subnormal temperature, pulse rapid and weak, breathing fast and shallow, and died promptly. The third case developed after operation for subacute appendicitis, from which she had suffered for a year. She developed nine days after operation hiccough, rise in temperature, severe pain in abdomen, general, fecal vomiting. Twenty c.m. of intestine was resected; patient died twelve hours later. These papers referred to may be read with profit, as to discussion of pathology and treatment. Some five hundred cases have been reported, and these undoubtedly represent but a small proportion of the actual number. (James F. Mitchell, article March 1923, *Loose Leaf Medicine*, vol. V. pgs. 597-8). C. B. Parker, of Toronto, says in an article, 1922. "When considering the etiology of this condition in the main, the causes of the obstruction of the mesenteric obstruction are embolism, thrombosis, sclerosis of the arterial wall, or a combination of the two, while venous obstruction is more complicated, and occurs almost invariably as thrombosis, although retrograde embolism has been described." He also says, "that thrombosis occurs in the liver or gall bladder, or pancreas, as a result of inflammation," and then he adds, "intravascular clotting may occur apart from sepsis and is apt to occur after operations in which veins are transfixed, as for example, suturing the omentum. In addition to these more common causes, there are many others recorded, such as thrombosis commencing in strangulated hernia, ulcers of the intestine, intussusception, abscess of the mesenteric glands, breaking down carcinoma, phlebitis of the lower extremities, prostatic abscesses, cirrhosis of the liver." Parker also says, "the prognosis depends on the length of intestine implicated

as the primary consideration; the length of time since the onset, and condition of the patient are of less importance. Nine cases of spontaneous recovery, well authenticated, are on record, twenty-five cases of successful resection, one of these being his own case. Treatment should include operation as promptly as possible, delivery of the affected bowel outside the abdominal wall, shock combated by all known means, interstitial infusion of salines, warm applications to the abdomen; if intestine be markedly distended, it should be emptied. Enough intestine must be removed to insure sufficient blood supply to the remaining intestine. If the upper part of the small intestine is required, axial union is the best."

Leo Brady of Baltimore says, writing in January, 1923, "Of five hundred cases reported, there were only thirty-five recoveries." He reports fourteen cases from the Johns Hopkins Hospital records, in three of which there were no infarctions and thrombosis was only discovered on autopsy. The bibliography listed gives further discussion on this subject.

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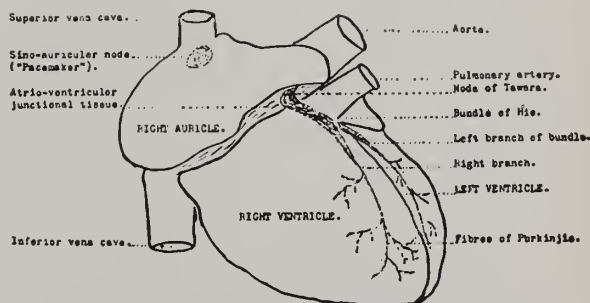
1103 W. Franklin St.

HEART BLOCK.*

By J. MORRISON HUTCHESON, M. D., Richmond, Virginia.

Clinical heart block was first described in 1875 by Galabin, who reported a case in which the auricle and ventricle contracted at different rates. This conclusion was drawn from auscultatory findings and tracings from the heart's apex. In 1899, His published polygraphic curves showing the same condition and suggested that it was due to a lesion of the auriculo-ventricular bundle. Hay, in 1905, recorded finding changes in the auriculo-ventricular bundle postmortem in a case that showed block during life. Thus the condition known as heart block became associated exclusively with diseases affecting the bundle of His.

Since the advent of more exact methods of tracing the contraction impulse, our knowledge of disorders of conduction has advanced rapidly, and the term heart block must now include not only the various grades of block in the bundle, but also certain disturbances which arise elsewhere in the course of the excitation wave as it passes through the heart chambers.



—The conduction system of the heart showing in shadow diagram the approximate relation of the more recently discovered structures to familiar anatomic divisions of the heart (after Smith).

Plate 1.

It will be remembered that the contraction wave starts in the sino-auricular node, spreads through the walls of the auricle and reaches the auriculo-ventricular bundle by which it is transmitted to the ventricles. The bundle divides into two main branches which supply the right and left ventricles and these in turn subdivide and spread or arborize through the ventricular walls (Plate 1). Any interference, therefore, with the orderly passage of the impulse from its origin to its destination may be properly termed heart block. It is to be remembered, however, that the whole conduction system is under the influence of the vagus

*Read at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

and that vagal stimulation may at times cause varieties of block which closely resemble those produced by the structural changes of disease.

By special methods of investigation several varieties of block may be readily recognized, and these have been classified according to the location in the conduction system at which they occur. Thus we may distinguish sino-auricular block of varying degree due to poor

small branches of the arborization system. The last two types are included under the term intra-ventricular block. Experimentally, these disorders may be produced in healthy hearts by injury to the conduction pathways at certain points and at times by stimulation of the vagus. Heart disease, however, rarely attacks isolated areas, so, when defective conduction is found in the human subject, it is usually

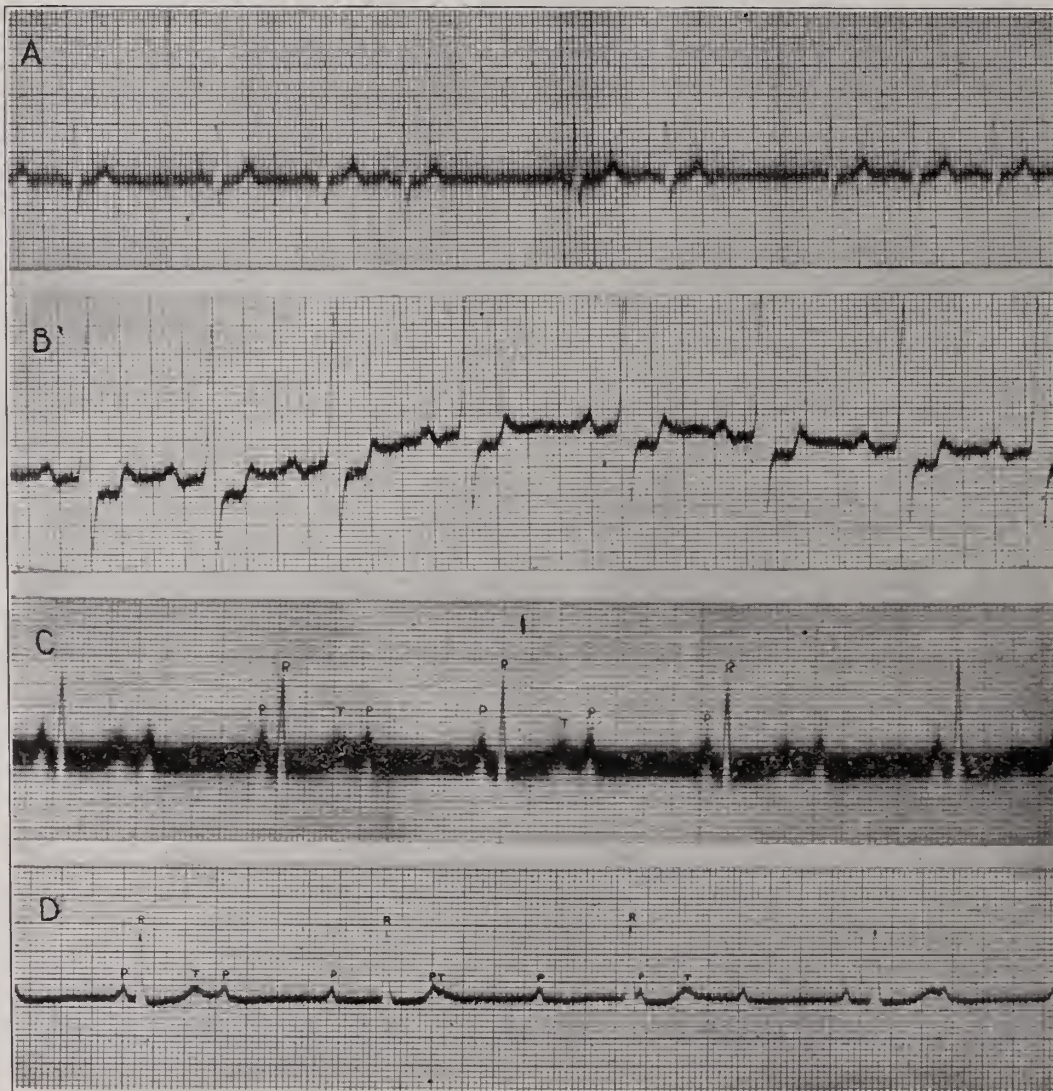


Plate 2.

Fig. A: Sino-auricular block. Irregularity of the whole heart with pauses equal approximately to two normal intervals. Fig. B: Prolonged conduction time resulting from Digitalis. P-R interval exceeds .2 second. Fig. C: Partial (2:1) block. The ventricle responds to every other auricular contraction. Fig. D: Complete block. Auricles and ventricles contracting at regular independent rates.

transmission in the bundle of His; bundle branch block where conduction is faulty in the right or left branch; and arborization block in which the defect lies in one or more

to be looked upon as one manifestation of widespread cardiac disease involving other structures besides the conduction system. Investigation, therefore, of the several types of block

yields information of value not only as to what the heart is doing but also as to the nature and extent of the disease with which it is affected.

Sino-auricular block is a rare disorder probably always due to extra-cardiac causes acting through the vagus. It often occurs in neurotic individuals, and may be produced by digitalis and caused to disappear by atropine. It manifests itself by sudden changes in the contraction rate of the whole heart producing intervals between beats equal approximately to two normal intervals. So far as cardiac efficiency is concerned, sino-auricular block is of no significance. Its recognition is, however, important at times, for it may easily be confused with partial block of the bundle, a condition of different significance. The record shown here (Plate 2, Fig. A) is from a neurotic individual of thirty-four who complained of palpitation and showed an irregular pulse but in whom no other sign of cardiac derangement was demonstrable.

Auriculo-ventricular block, or A-V block, as it is commonly called, is due to impaired conduction in the bundle of His. It may be the result of syphilitic or rheumatic infection or other chronic degenerative processes where actual tissue change is demonstrable in the bundle, or it may occur as a temporary affair in acute infections or from digitalis. There is a prevalent idea that syphilis is the chief cause, but this is not borne out by the facts. White found syphilis in sixteen of 156 cases, while Willius, in an analysis of twenty-two cases of complete auriculo-ventricular dissociation found none syphilitic.

Auriculo-ventricular block may be partial or complete. Experimentally, the several grades may be produced by exerting varying degrees of pressure on the bundle grasped in a forcep. The mildest form is that in which there is delay in impulse transmission from auricle to ventricle. This defect can rarely be made out by clinical means, yet it is suggested when the first sound is reduplicated or, in cases of mitral stenosis, when the murmur or thrill or both occur in early diastole (Plate 2, Fig. B). When the block in the auriculo-ventricular bundle is more pronounced the ventricle fails to respond to certain impulses, causing either an occasional dropped beat or a succession of them. Commonly there is a ventricular response to every other auricular beat giving rise to what is known as two to one

block. The latter condition usually shows a pulse rate of from forty to fifty per minute, and upon exercise this rate at times doubles abruptly. Plate 2, Fig. C, showing a two to one block was taken from an elderly patient with arteriosclerosis, who later showed a complete block.

When conduction from auricle to ventricle is completely obstructed the ventricle assumes its own rate which is as a rule abnormally slow (Plate 2, Fig. D). Nearly all patients who show a ventricular rate of thirty-five or less have complete block. On auscultation the first and second sounds are heard as usual, but often there is a third sound, the auricular contraction, which may occur at any point during diastole or fall with the first or second sound altering their character somewhat. In cases of mitral stenosis, this third sound may be accompanied by a murmur. Pulsations may also be seen in the jugulars corresponding to auricular beats and exceeding the ventricular rate.

Auriculo-ventricular block, by reason of the abnormal slowing of the heart rate, is at times accompanied by attacks of unconsciousness known as the Stokes-Adams syndrome. These occur, however, in the minority of cases, and as a rule the block itself and the resulting slow rate produce no symptoms. The illustration, Plate 2, Fig. D, was taken from a case of rheumatic heart disease with mitral stenosis, complete A-V block and Stokes-Adams attacks. Auricular contractions were plainly heard between ventricular beats and were followed by a distinct murmur.

Except in the transient forms due to toxic agents or to acute infections, auriculo-ventricular block is of grave significance. When persistent, it is always to be regarded as evidence of disease, not limited to the bundle, but affecting the entire myocardium. The recognition of A-V block is therefore of vast importance, as it may be the only sign of severe myocardial damage. Notable exceptions have been recorded, but as a rule chronic high-grade block of the bundle means death in a few years from general heart failure.

In the treatment of patients who show incomplete A-V block, digitalis is theoretically contraindicated on the ground that it may cause complete dissociation. Digitalis does usually increase the grade of block, but this effect is in itself comparatively harmless and cannot be weighed against the good to be derived from the use of the drug to improve

cardiac efficiency. Where the block is already complete, digitalis cannot affect it further and may be given when heart failure demands it. In cases due to toxic agents, atropine will often cause the block to disappear. For the relief of attacks of Stokes-Adams syndrome, adrenalin has proved of value. Where syphilis is a possible factor, antiluetic treatment is indicated, but instances in which the block has disappeared as a result of antiluetic therapy are rare indeed.

Intraventricular block or defective conduction beyond the bundle has been the subject of considerable discussion in the past few years. It appears to be more frequent than auriculo-ventricular block and, according to several observers, is of graver prognostic import, indicating severe myocardial damage with extremely high mortality. In those cases in which autopsies have been made, advanced

are involved. Patients with this condition usually show symptoms and obvious signs of heart failure, but occasionally the electrocardiogram furnishes the only evidence available. Even in the absence of symptoms, an electrocardiogram of this character should demand the greatest caution, especially as regards physical or mental strain. It is probable that many of the unexpected deaths following surgical operations occur in patients having this type of heart. Plate three illustrates the electrocardiographic findings in a case of right bundle branch block. This patient had survived what seemed to be a coronary thrombosis, and when seen showed an enlarged heart with broken compensation. On digitalis, compensation was restored, but the bundle branch block persists. Plate four shows arborization block in an individual with no symptoms except vague precordial pains; no cardiac enlarge-

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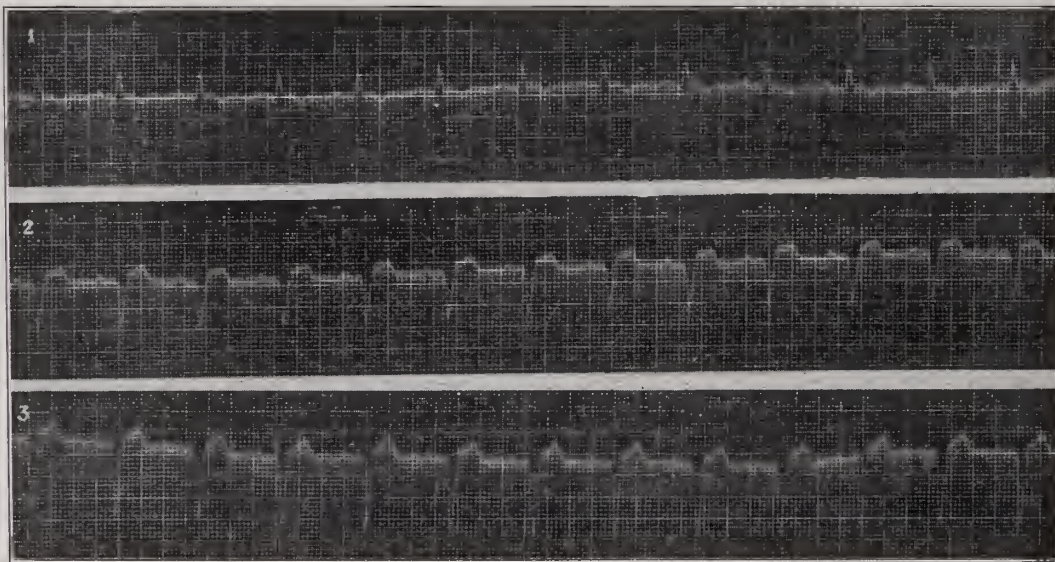


Plate 3.

Right bundle branch block. QRS complex abnormally wide (.12 sec.) inverted in leads II and III with high wide T wave in opposite direction.

sclerosis of the coronary arteries and extensive myocardial fibrosis have usually been found. Willius, in an analysis of 112 patients, in whom intraventricular block was found, reported a mortality of 69.6%, the average duration of life from the time of examination being 8½ months.

The electrocardiograph distinguishes two types of intraventricular block: bundle branch block where one of the main branches is affected, and arborization block where one or more small branches in the arborization system

ment, murmurs, or signs of vascular degeneration were made out. Sudden death occurred two months after the record was taken.

Unfortunately, not all types of heart block can be identified by ordinary clinical methods of examination, but a familiarity with what has been learned from electrocardiographic and other studies is an invaluable aid to those who seek to know all that can be known about a possibly diseased heart. With a clear understanding of normal cardiac conduction and of the defects known to occur in disease, one may,

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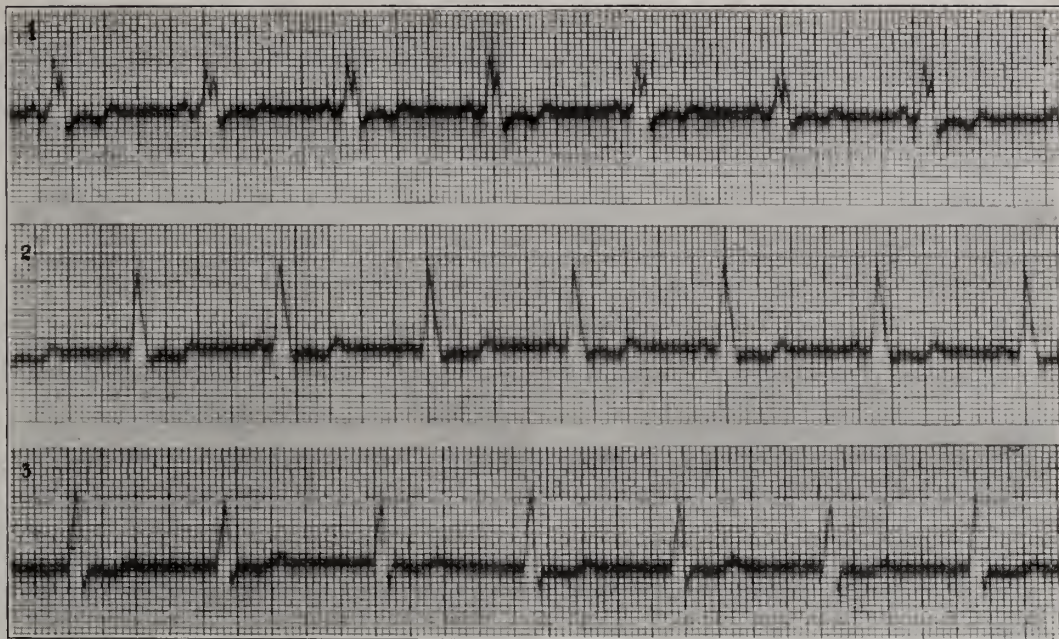


Plate 4.
Arborization block. R wave notched and abnormally wide (.14 sec.) in all leads.

by diligent application of the unaided senses, detect or at least suspect the several types of block with a surprising degree of accuracy.

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209 Professional Building.

CRANIAL INJURIES.

Hemorrhage and Economic Prognosis.*

By GEORGE TULLY VAUGHAN, M. D., LL. D., F. A. C. S.,
Washington, D. C.

A great surgeon has said that no injury to the head is so slight as to be ignored or so serious as to be regarded as hopeless.

For example, a boy 18 years old was struck a light blow on the head with a broom-stick. In less than an hour unconsciousness and spasms of the extremities came on. At the operation no injury to the skull was found, but extensive intracranial hemorrhage, which caused the death of the patient in a few hours.

On the other hand, a workman blasting had

a tamping iron about one inch in diameter at the large end and tapering to about one-fourth of an inch at the small end and over four feet in length, driven entirely through his brain and survived the injury fifteen years. The specimens, tamping iron and patient's skull, can be seen in the Harvard Medical Museum.

The injury may be an abrasion, a contusion, or open wound affecting the scalp alone, or it may go further and involve the bone or the brain itself.

Just as in the abdominal or thoracic cavities the viscera may be ruptured without damage of the containing walls, so in the cranium, the brain and its blood-vessels may be ruptured without fracture of the skull. Conversely, fractures of the skull may occur without brain

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injury, but as a rule fractures of the skull mean injury to the cranial contents.

The varieties are as to region, those of the vault and those of the base. As to exposure to the air, shape, size, etc., simple or closed, compound or open, linear, stellate, depressed, complete and incomplete, local or limited; as general or bursting.

Fractures of the base are recognized also according to the fossa affected—each being characterized by a superlative: Fractures of the anterior fossa are least fatal; of the middle fossa, most frequent; of the posterior fossa, most fatal.

Naturally the importance of fracture depends on the injury to the brain, blood-vessels and nerves, and one of the commonest of these conditions is hemorrhage.

Traumatic intracranial hemorrhage comes from the blood-vessels between the skull and dura mater, from those on the surface of the brain, or from those within the brain substance. Usually the cause is a fracture or diastasis of one or more of the cranial bones, but sometimes vessels are lacerated and at the same time the skull escapes fracture. The symptoms are caused chiefly by compression from the effused blood or clot and come on rapidly according to the size and situation of the clot, in the form of unconsciousness, spasms, paralysis, vomiting, headache, somnolence, slow pulse, special eye symptoms, and changes in blood and cerebrospinal fluid pressure and contents. In many cases there is a *silent* or *free interval*, a name given to that period of time which elapses between the receipt of the injury and the onset of serious symptoms from pressure by the effused blood.

The blow on the head may stun the patient and cause headache and nausea, but he may go on about his business apparently normal for hours, days, or weeks, before the collection of blood which is gradually increasing reaches sufficient size to produce marked symptoms of compression. It is during this silent interval that many sad mistakes in diagnosis have been made: as the patient feeling nauseated and dizzy may have taken an alcoholic stimulant and, walking with uncertain gait, is taken up and put to bed in a station house or elsewhere without medical attention, charged with intoxication, and some hours later he is found dead from intracranial hemorrhage. According to Connell, the silent interval varies from a few

minutes to six or eight weeks—the average seems to be about 24 hours.

When the signs of compression, headache, vomiting, spasms, or paralysis, slow pulse, somnolence, perhaps unconsciousness, come on, the skull should be opened where the focal symptoms indicate the lesion, preferably by an osteoplastic flap of large size. The flap is replaced after the operation and leaves no defect in the skull.

For bleeding from the bone, sometimes a troublesome complication, I have been using for many years a piece of soft tissue, muscle or fascia, cut from any convenient part of the wound, and pressed or rubbed on the bleeding surface until it sticks.

From an economic standpoint, the prognosis in wounds of the head (cranium) is important, as the earning capacity is diminished in many on account of headache, paralysis, or epilepsy. T. Crisp English (*London Lancet*, Feb. 20, 1904), as a result of the investigation of 300 cases of head injuries from one to twelve years after the injuries had been inflicted, concluded that from 20 to 40 per cent had their wage-earning capacity reduced or destroyed, especially if their work were intellectual in character.

L. B. Rawling, (*Br. Journal of Surgery*, July, 1922) wrote letters to 1,000 patients who had received gunshot wounds of the head during the World War. Of 452 replies up to 1920, 30 per cent claimed complete disability, 26 per cent doing a little work, and only 43 per cent doing ordinary work. The conditions causing disability were headache 89 per cent, giddiness 77 per cent, nerves 68 per cent, paralysis 29 per cent, and fits 25 per cent.

The following history of a patient with intracranial hemorrhage is selected from a number of such cases as illustrating many points of interest.

A. J. H.: white; 51 years old; salesman; was hurt in an automobile accident July 25, 1922, receiving a scalp wound about three inches long in the *left* occipital region. He was not unconscious but had symptoms of concussion—vomiting, dizziness, and headache. He continued going about attending to his business for five weeks, taking long trips by rail or automobile, suffering somewhat at times with headache and weakness, but otherwise seemed normal. At the end of five weeks the headache and weakness had increased. There

was mental dullness and somnolence so that he took to his bed. During the next three weeks these symptoms continued to increase, except the headache of which he no longer complained, to a condition of complete apathy. There had been no fever but a subnormal temperature (97-98), pulse had been slow (60 or less), no change in eye grounds on ophthalmoscopic examination and spinal puncture and X-ray of skull were negative.

I first saw him September 28, lying in bed apparently asleep. Shaking him caused him to open his eyes, but he would not speak and at once dropped back into somnolence. Pulse 60, involuntary and unnoticed evacuations from bowels and bladder, reflexes exaggerated and leucocytes, 14,000. Pupils slightly dilated but reacted to light.

The diagnosis was compression of the brain from abscess, blood, cyst, or tumor. Owing to the long time, eight weeks, which had elapsed and the subnormal temperature since the injury, it was thought probable an abscess existed. The location of the lesion was impossible and, as there were no focal symptoms, it was decided that it must be in a silent area of the brain, and as these areas are more numerous on the right side of the brain, it was thought best to expose as large a portion as possible of the *right* hemisphere, although the injury received had been on the *left* side of the skull.

Seen at twelve o'clock that night after transfer to hospital, the patient was comatose, pulse 110, temperature 101, and he was in a profuse sweat.

Next morning, September 29, 1922, the pulse was less rapid, the coma not so deep, and the nurse reported having observed slight twitching of the *left* foot. This was encouraging to the decision already made to expose the *right* side of the brain, so a large osteoplastic flap, $5\frac{1}{2}$ by $4\frac{1}{2}$ inches, was turned down on the right side of the skull exposing the larger part of the right hemisphere covered by a blue and pulseless dura mater. On turning down the dura, a large clot of blood was found beneath the arachnoid, extending from the extreme front of the frontal lobe back to the occipital lobe and down to the base, causing a deep indentation into the cerebral tissue, like the bed of a large tumor. On removal of the clot no pulsation at first was seen in the brain, but in a short time feeble pulsation was noticed. No bleeding point was found. The dura and the

osteoplastic flap were sutured in place without drainage.

On awaking from the anesthetic, the patient talked rationally, recognized persons and called for a urinal when needed. There was no complication attending the patient's recovery and he was discharged from the hospital October 26, 1922. When last heard from in July, 1923, he was apparently perfectly well and attending to his business as usual.

The following points in this history may be emphasized:

1. Hemorrhage without fracture.
2. Hemorrhage on the opposite side to that receiving the blow.
3. The long silent interval, five weeks, during which the blood was escaping and accumulating on the surface of the brain.
4. The difficulty in locating the lesion in the brain as there were no focal symptoms such as spasm, paralysis, choked disk or aphasia.
5. Effect on earning capacity. There seems to be no deterioration in this respect and no complication so far.

1718 I Street, Northwest.

THE RELATION OF FOCAL INFECTION IN THE PRODUCTION OF OCULAR DISEASE.*

By H. MAXWELL LANGDON, M. D., Philadelphia, Pa.

This paper is written not to bring forth anything that is original nor to refute anything which has been written. Its sole purpose is to set forth the facts concerning a group of cases of various ocular conditions, all of which have had as their cause some focal infection which could not be located except by careful examination and in two of which, numbers nine and thirteen, the signs were so misleading that it was only the insistence of the ophthalmologist which led to operation and the preservation of vision.

As will be seen, the ocular conditions are variable in type and have no definite connection with the site of the underlying cause, very similar changes resulting from sinus, tooth and tonsillar infections.

If any one thing is impressed upon us by the facts here related, it would seem to be that the human body is an entity and not a group of independent parts, and that trouble in one organ is frequently the result of disease elsewhere in the individual, and can be found only

*Read at the meeting of the Virginia Society of Otolaryngology and Ophthalmology in Richmond, April 18, 1923.

after painstaking search, and that the physician must not become so highly specialized that he regards the organ of his particular interest as isolated.

So recent is our knowledge of the relation of sinuses and teeth to the ocular structures that it seems probable that in several of these cases the cause would not have been discovered had they occurred fifteen years ago and the vision, if not the eyes, would probably have been lost. Several would have been attributed to syphilis, as many to tuberculosis, and the rest distributed among the mysterious causes then assigned for such happenings.

CASE 1. Miss E. B. S., age twenty-one, was seen on March 4, 1922, complaining of blurred vision of each eye. Examination showed no changes in any structure of either eye. O. D. V. was 5/10, the best corrected vision being 5/9 plus; O. S. V. 5/8 partly, capable of correction to 5/6. Examination of the visual fields showed normal peripheral limits with a relative central color scotoma, the diagnosis being retro-bulbar neuritis. Physical examination showed a rather low blood pressure, 100—65, hemoglobin sixty-eight per cent, reds 3,250,000 and whites 5,000. Wassermann weakly positive, but no other findings. Examination of the teeth showed them in good condition. The tonsils had been removed and the sinuses were reported as healthy. Vision not improving under iodids, another rhinologist, Dr. Ross Hall Skillern, was asked to see the patient and he felt that there was enough sphenoidal infection to account for the trouble. The sphenoids were drained and in six weeks vision was 5/5 plus in each eye.

CASE 2. Mrs. W. L. H., age forty-two, first seen in 1906 and at intervals since then for refraction. On December 1, 1922, came complaining of a blur before O. D. Central and peripheral vision were normal and there were no fundus changes. Three days later central vision had fallen to 5/8 and there was a central relative scotoma for red and green. A diagnosis of retro-bulbar neuritis was made. Examination showed a hyperplastic sphenoiditis of the right side, treatment of which caused a disappearance of the ocular symptoms. At no time were there fundus changes.

CASE 3. Mrs. P. E. D., age thirty-five, first seen in October, 1914, for refraction. On July 13, 1922, came complaining of blurring of vision of O. S. for the preceding ten days, during which time she had had a cold. The right

eye was normal in all respects; the left eye showed no changes save for a central vision of 5/15 with a central relative scotoma for red and green. A diagnosis of retro-bulbar neuritis was made and examination showed involvement of the right sphenoid, which was opened. By August 9, 1922, the scotoma had disappeared and central vision was 5/5 plus.

CASE 4. Mr. A. H., age thirty-nine, seen first December 27, 1915, for refraction. On April 26, 1921, he reported complaining of blurred vision of O. S. Examination showed O. D. normal in all respects. O. S. V. was 5/15 with a crescentic patch of retinal edema at the macula. Wassermann was negative as were the nasal passages and throat. Three teeth were found to have apical abscesses, extraction on May 10, 1921, resulted in a subsidence of the retinal edema with a return to normal vision by June 10, 1921.

CASE 5. Mrs. E. T. L., age sixty, reported on July 19, 1920, with a history that O. S. had been sore since the preceding day. Examination showed O. D. normal with a vision of 6/10. O. S. slight ciliary injection with two posterior synechia and a vision of 6/15. Examination showed normal urine, negative Wassermann, two teeth with apical abscesses and an involvement of the ethmoid cells. The teeth were extracted and the ethmoiditis treated by suction, the patient however not objecting to more radical procedure. This attack cleared up but two months later O. D. was involved. In January, 1921, the left eye was again involved which lasted, with short intermissions, until August of that year when the left antrum and the ethmoid were cleaned out, with an almost immediate improvement in the ocular condition, and without return up to the present. Corrected vision is normal and, except for a few pigment spots on the anterior capsule of the lens, the eye is undamaged. One of the interesting things about this case was a sensitization to atropin after a long period of use and the necessity of using scopolamine; also interesting was the long dilatation of the pupil without increase in ocular tension in a woman of sixty.

CASE 6. Mr. B. H., age twenty-five, first seen March 13, 1917, with a history that O. D. had been inflamed four years previously, with some recurrence at times. O. S. had been sore the previous week. O. D. was normal in all respects with a vision of 6/5. O. S. showed intense ciliary injection, with a cloudy cornea,

the pupil filled with exudate and a slight hypopyon; vision being perception of hand motions at one foot. The eye had been under indifferent treatment. Under suitable local and general measures, conditions improved so that in four days the exudate in the pupil was absorbed and vision was 6/25. The Wassermann was negative, the teeth were in good condition but the sphenoids were infected. On April 27, 1917, a hemorrhagic retinitis developed in O. S. which treatment quieted, the nasal treatment consisting in the use of the suction apparatus. In June the right iris became inflamed, but the attack was light. In August, 1918, O. S. was again involved, the iris being so congested that there was hemorrhage from it, into the anterior chamber, leeches being required to lessen the iritic hyperemia; a similar attack occurred three months later. In December, 1919, a retro-bulbar neuritis with central scotoma and some edema of the disc appeared in O. D., vision falling to 6/30 to return to 6/5. Radical operation has been refused though he has had several ocular inflammatory attacks, each aborted by nasal treatment.

CASE 7. Mrs. E. S. S., age thirty, seen first June 30, 1921, with a severe irido-cyclitis of O. S., O. D. being normal in all respects with a vision of 5/5. O. S. had a vision of 5/60. Local treatment was prescribed and nasal examination by Dr. Seth A. Brumm showed the left nasal cavity in bad condition, with the ethmoid probably involved, and X-ray examination by Dr. George E. Pfahler showed a cloudy ethmoid. Operation confirmed these findings with almost immediate improvement. By July 15, 1921, two weeks after the first visit, the eye was white and vision normal.

CASE 8. Mrs. A. H. C., age thirty, was first seen February 15, 1915, for refraction. On December 7, 1915, she again reported, this time with an inflamed right eye, which went on to a severe irido-cyclitis with much K. P. and iris engorgement. Physical examination including a Wassermann was negative, but nasal examination showed a septum deflected to the right with acute infection of the ethmoid and sphenoid cells. They were treated and by December 27, 1915, the eye was white. On August 1, 1919, there was another outbreak in the same eye and again intra-nasal interference was required, with prompt relief, the eye being clear in two weeks. A third attack started December 19, 1922, with much congestion of

the iris and chemosis of the conjunctiva. Pus was obtained on opening the ethmoids and by January 2 the eye was again almost white, with normal vision.

CASE 9. Mrs. C. C., age thirty-three, was first seen on February 3, 1923, with a right eye which had been sore for about twelve hours. There was considerable corneal haze, and ciliary and iritic congestion, the vision being 5/10. O. S. was quiet with a vision of 5/5. Teeth, Wassermann and general physical examination were negative. She was seen by three rhinolaryngologists all of whom said the sinuses were negative but the tonsils were badly infected. Following an expression of infectious material from the tonsils, the eye greatly improved, seeming positively to point to the source of infection. The tonsils were removed February 9, 1923, and the eye became worse, the pupil filled with exudate, cornea densely hazed and the conjunctiva so greatly chemosed that it over-hung the limbus; vision at this time was scant light perception. In addition to the other local remedies, leeches were applied to the temples with no great relief. On February 14 there was a small hypopyon. Consultation was again held with the laryngologist, Dr. Ross Hall Skillern, who could still find nothing to suggest sinus involvement. The eye continued in its severely inflamed state and on February 18 the writer insisted on amputation of the right middle turbinate, which was done by Dr. Skillern the following day, when there was found in the sphenoid a thin blood-tinged serous fluid. In forty-eight hours the improvement in the eye was most remarkable, the cornea being clear enough to see that the vitreous was quite hazy; in three days more the vitreous was clear enough to see that the disc and retina were quite edematous. Improvement however continued and in four weeks from the nasal operation, corrected central vision was normal.

CASE 10. Mr. N. W. B., age twenty-six, first reported on August 1, 1922, complaining of blurred vision of O. S. for the preceding twelve days, without pain or other symptoms. O. D. V. was 5/5 and this eye was normal. O. S. V. was 5/25 without external changes. The vitreous was quite hazy and there was a large patch of exudative choroiditis to the nasal side of the disc and about twice its size. It was believed to be either syphilitic or tubercular. Specific infection was denied and a blood Wassermann was negative, physical examination

was negative and tuberculin injections gave no reaction; the teeth were in good condition. Nasal examination showed that the sphenoids and posterior ethmoids were the site of a low grade inflammatory process and they were drained on August 24, 1922. By September 5, 1922, vision was 5/10 and by September 29 the vitreous was quite clear, vision was 5/5 and the choroidal patch quiet.

CASE 11. Dr. E. B. K., age twenty-seven, had been refracted first ten years ago. On January 30, 1923, he reported that O. S. was tender and that there had been some photophobia. Examination showed some slowness of pupil activity but no other changes. On February 2 there was some congestion and the following day some K. P. as well as a linear infiltrate into the lower portion of the cornea. Blood and urine were negative, Von Pirquet negative, Wassermann negative, sinuses negative, one apical abscess at root of lower left second molar tooth, cultures from tonsils showed streptococcus viridans and staphylococcus aureus. The tooth was extracted and the tonsils treated, cultures from the tooth showing streptococcus viridans. On February 12 the eye was distinctly better and went on to complete recovery by February 28.

CASE 12. Miss E. B. V., age seventeen, was first seen on October 27, 1922, with blurred vision of O. D., which had then lasted for two weeks. No other symptoms. O. D. V. was 5/35 with a large central scotoma, the disc was hyperemic with some blurring of the temporal margin. O. S. V. 5/5, the eye being normal. Wassermann and Von Pirquet tests negative, sinuses, blood, urine and teeth negative, but the tonsils were badly infected, and were immediately removed. On November 4, O. D. V. was 5/15, the disc still being swollen with a complete macular wheel. By November 24, O. D. V. was 5/5 and the fundus was normal except for slight hyperemia of the disc and one or two "spokes" remaining of the macular change; central color vision was normal.

CASE 13. Mrs. M. B. W., age fifty-two, seen on January 3, 1917, complaining of blurred vision of O. D. with pain in the right frontal region following influenza. O. D. V. was limited to counting fingers at two feet, the direct pupil response was abolished but consensual reaction was good, a condition which was reversed in the left eye. The right disc was hyperemic with blurring of the margins. The left eye had normal vision, full field and

no changes except the loss of consensual pupil activity. Dr. George B. Wood could find no signs of sinus involvement and X-ray examination by Dr. H. K. Pancoast was negative, but so plain did the underlying cause seem to be that the sphenoids were opened on the writer's insistence on January 28, 1917. Almost at once an improvement in vision was noticed and, by February 2, 1917, vision of O. D. was 6/20 and one week later corrected vision of this eye was 6/6.

These cases may be divided into three groups according to the site of the original focus, or into types of ocular involvement in which case four groups will result, and it has seemed well to select this second classification. We then have group one where there was an acute uveitis of greater or less intensity to which six of the cases belong; five resulting from sphenoidal or ethmoidal involvement and one from a tooth root abscess; group two, of retrobulbar neuritis with four cases all due to sphenoidal involvement; group three, with two cases of retino-choroiditis, one due to sphenoidal hyperplasia and the other to a tooth root abscess, and one case of neuro-retinitis with tonsillar infection as the cause.

From this analysis we see that there is no definite connection between the site of the original infection and the type of the ocular inflammation and that a diagnosis of the ocular disease will not *per se* enable us to locate the original infection, but a complete physical examination is the only reliable method of procedure. It will be realized from a study of the cases in group two that at times this type closely simulates the result of tobacco-alcohol amblyopia and may be very difficult to differentiate from that condition. It seems quite probable that some of the tobacco cases, in which in spite of the cessation of the use of the toxic agents the visual defect persisted, were also affected by unrecognized sinus involvement and therefore naturally were not cured by the removal of the influence of the tobacco and alcohol.

As to the method of the production of this type of neuritis by sinus disease, two views are held, one that it is an actual neuritis due to the seeping through the thin bony wall of the sphenoids of toxic material from the sinuses, and the other that it results mechanically from pressure on the nerve. Of these theories the former seems to the writer to be the more probable.

The course of transmission is either by continuity of tissue involvement, through the lymphatic or through the blood stream.

Retro-bulbar neuritis from sphenoid or ethmoid involvement is an example of the first method, uveitis from sphenoidal infection of the second, and neuro-retinitis from infected tonsils of the third.

The most important item of the treatment after the source of the infection has been localized is its radical removal. Palliative treatment by vacuum or suction apparatus is, in the writer's experience, useless and to be avoided unless there is a very definite contra-indication to more radical proceedings. Nothing but good has followed the opening of the sinuses in any case which the writer has seen and he believes that in case of doubt this should be done.

When we come to consider the proportion of these various groups which are caused by focal infection we find no reliable figures. Formerly we believed that the greater number of cases of irido-cyclitis were due to syphilis, tuberculosis, gonorrhea or rheumatism, now it seems that at least one-half of the cases of this condition or of uveitis are due to localized infection, and this estimate is probably too low, and we now know that there is no such entity as "rheumatism."

Retro-bulbar neuritis was "tobacco-alcohol amblyopia" or from some similar toxemia; of this condition it would seem that at least two-thirds the cases are from sinus disease, and many of the remainder are complications of disseminated sclerosis.

Retino-choroiditis is still probably most frequently due to syphilis or tuberculosis and only in an occasional instance does it result from focal infection as in Case No. 10 of this series.

The two needs which it is hoped this paper has shown are first a prompt and complete physical examination, and second as thorough a removal of the cause as is possible.

1530 Locust Street.

FACTORS IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS.*

By O. O. ASHWORTH, M. D., Richmond, Va.
Assistant Attending Physician, St. Elizabeth's Hospital, Richmond; Formerly Assistant Physician, Catawba Sanatorium, Virginia.

Clinical tuberculosis may develop in only two ways. These are, once infection takes

place, through the renewal of activity of latent foci which have existed for variable lengths of time, or through the uninterrupted progression of foci from the time of infection to the cropping out of symptoms.

While there is no tuberculosis without tubercle bacilli, these cannot do harm unless one is predisposed to the disease. Naegli in 1900 published a report of five hundred autopsies. Seventy-one per cent showed pathological changes due to tuberculosis. Among individuals under eighteen, only twenty-five per cent showed lesions, but in persons above eighteen years of age the proportion that showed traces of infection reached ninety-eight per cent. Other pathologists have since confirmed Naegli's findings. It is rare to find an adult who does not show some skin reaction to tuberculin, irrespective of his economic or social condition. While it is known that where there is most poverty, tuberculosis is more often found, it must not be assumed that it is confined to those of the poorer class. An investigation of the number of patients in private sanatoria who can pay more than \$50.00 per week for treatment is convincing. The nature of predisposition is a complex affair, and may be due to physiological and anatomical factors, but it is most certain that environment, a wrong living plan, whether adopted by the poor or rich, plays the greatest role.

What is chiefly aimed at in practice is discovering tuberculous disease. The patient is interested in the results of tuberculous infection and whether any special line of treatment is necessary to improve his health. This information can only be given after a careful inquiry into the patient's history and symptoms and a consideration of the physical signs elicited by an examination of his chest and other parts of his body, with routine laboratory examinations, and the X-ray when necessary and available. A hasty diagnosis of a suspected lesion is as hazardous as neglect to recognize active disease.

While tuberculosis is not hereditary, it is a fact that several members of a family are often affected, either because they all have been subject to similar environmental influences, or from massive infection during infancy and childhood. It rarely occurs in consorts or those exposed to the disease in later life. While tuberculosis itself is not hereditary, a weakened re-

*Read before the Southside Virginia Medical Association at Emporia, September 11, 1923.

sistance to this disease may be transmitted hereditarily.

General symptomatology in doubtful cases is of more significance than indefinite physical signs. There is no active tuberculosis without constitutional symptoms. Pottenger has classified the symptoms of tuberculosis into three groups: (1) Those due to toxemia (malaise, lack of endurance, lack of strength, nerve instability, diminished digestive activity, increased metabolic rate, loss of weight, tachycardia, night sweats, fever, leukocytosis); (2) Reflex causes (hoarseness, tickling in larynx, cough, digestive disturbances, loss of weight, chest and shoulder pains, flushing of face); and (3) Those due to the process *per se* (hemoptysis, sputum, frequent and protracted "colds," and pleurisy). It is evident that, if there are multiple symptoms from the toxemia, a rather extensive or virulent early process exists. Symptoms from reflex causes and the process *per se* may occur in an early or a late process. From all symptoms mentioned in general, lack of endurance, loss of weight, nerve instability, lack of appetite, rapid pulse, and fever are the most constant manifestations. These are the physiological effects of tuberculin when injected.

The signs of early tuberculosis are not those of consolidation or increased density, but of irritation and toxemia. Cabot states, "In the earlier stages of incipient tuberculosis there may be no recognizable physical signs. The earliest physical signs are fine crackling rales." Osler says, "Feeble breath sounds are the most frequent characteristic early signs. The expiration is usually prolonged." If the numerous foci of miliary tuberculosis cannot be discovered in their early stages by auscultation, percussion, or radiography, it is not logical to believe that it is possible to detect the incipient lesion by auscultation and percussion before granular breathing or rales have made their appearance.

Inspection may lead to a strong suspicion of tuberculosis, but an opinion should never be given by simply looking at a patient, for many who appear strong are suffering from tuberculosis. A dilated pupil, flushed cheeks, lagging or limited movement of one side of the thorax, unilateral atrophy of breasts or muscles of thorax, axillary sweating, displaced apex heart beat, supra- and infra-clavicular depressions, drooping shoulder, prominent scapula,

deformity of spine, curved finger nails, and clubbing of fingers must be observed, but the absence of all these is not conclusive of the absence of tuberculosis. Palpation may detect rigidity of the muscles of the neck and thorax, apex impulse of heart, thrill, or increase and decrease in tactile fremitus, enlarged cervical, supra-clavicular and axillary glands. In percussion a light stroke should first be used, beginning at the base of one side and percussing upward to detect small degrees of variation from the normal pitch. The interspaces of the two sides should be compared, bearing in mind the normal anatomical differences in the note. The diaphragmatic excursion and Kronig's isthmus may be obtained by tidal percussion and compared on the two sides. An increase in retrosternal dullness at the borders of the heart may be approximated. Resistance offered to the pleximeter finger is often of more value than an attempt to hear an impaired note. The axilla should never be omitted. It must be remembered that hyperresonance is often present over extensive pathology.

As in percussion, auscultation should begin at the pulmonary bases and go upward. With quiet breathing, variations from the normal should be noted, comparing the two sides. Feebleness or roughness of respiratory murmur, granular breathing, rales, pleural friction, prolongation of expiration, tubular breathing, increased whispered voice, cog-wheel or wavy breathing, cardiorespiratory murmur, should be charted with the blood pressure reading and the character of heart sounds.

Each patient should be taught how to expire and cough and, if rales were present with breathing before cough, it should be noted whether they disappear or are provoked by cough. Rales which disappear during examination are usually of no significance. To be of significance, rales must be strictly localized over a limited area and persistent but, when present, whether basal or apical, their existence should be explained. In minimal cases, not over one per cent show rales except after cough. In moderately advanced cases from fifty per cent to seventy-five per cent, and in far advanced cases from forty per cent to fifty per cent show rales only after cough. Therefore, the value of the expiratory cough in diagnosis cannot be over-estimated.

Pottenger has given the most logical expla-

nation of the small heart in tuberculosis—that it results from defective filling of the chambers of the heart on account of impaired breathing. During a year's experience in routine repeated blood pressure readings in incipient cases of tuberculosis at Catawba Sanatorium, I did not find hypotension a feature of diagnostic value.

Laboratory examination of the sputum, if there is any, using concentrated methods, is of inestimable value. However, in the average sanatorium where repeated examinations are made, tubercle bacilli are not found in more than sixty per cent of the cases (far advanced, moderately advanced, and minimal cases). Routine blood examination may show a mild leukocytosis or a leukopenia with diminished hemoglobin, and often relative increase of lymphocytes.

Even where pulmonary lesions are definite, radiography by a skilled radiologist in conjunction with a thorough clinical examination will give a much more comprehensive and complete idea of the case, both as to diagnosis and prognosis, than is possible from physical examination alone.

That too little effort is being made by the medical profession to make an early diagnosis of pulmonary lesions is realized by a study of the annual reports of the Virginia State Tuberculosis Sanatoria. These reports show that more than fifty-five per cent of the cases admitted for treatment are suffering from far advanced disease—and this does not include cases rejected because too far advanced for admittance.

Medical Arts Building.

SPASMUS NUTANS.*

By ALEX. F. ROBERTSON, Jr., Staunton, Va.

We have chosen spasmus nutans as our subject on account of its rarity and good prognosis. While this is a well recognized condition among pediatricians, it is not often encountered or generally known by the internist. Not uncommonly these little patients are carried from clinic to clinic, and run the gamut of a complete neurologic examination including lumbar puncture and spinal fluid examination before a diagnosis is made.

Spasmus nutans or nodding spasm is a functional nervous affection seen in infants usually

between the sixth and twelfth months of age, and limited to the first two years of life. It is slightly more common in boys.

The onset is always in the winter months between November and March. There seems to be a definite relation to dentition, although some authorities think this merely coincidental.

ETIOLOGY. A slight rickets is nearly always present. Most authorities claim that it is invariably associated with rickets. The theory that it is due to poor lighting of the nursery is not generally considered tenable. The hypothesis has been advanced that this affection is brought about by slow myelization of the nerve fibers of the central nervous system. There have been no autopsy findings to prove or disprove this theory.

PROGNOSIS. The prognosis is conceded by all to be good. Still, from whose work we have obtained the best description which we have been able to find of this condition, says the prognosis is 100% good. Epilepsy and idiocy do not follow. A few of these children later in life are nervous and eccentric, but this is not the rule. It has occurred to us that their attacks of spasmus nutans in infancy are merely early manifestations of a nervous or neurotic tendency. Recovery may occur in two or three months, and is usually complete by the end of the second year. After apparent recovery, this condition may temporarily recur in moments of excitement.

SYMPTOMS. *First:* rhythmic movements of the head, which may be anteroposterior, lateral rotation, or a combination of the two. These movements vary from twenty to one hundred and twenty a minute, and come in cycles, with widely varying intervals of quiet between, and are usually absent when the child's attention is fixed. They occur only when the head is held erect. *Second:* nystagmus. Nystagmus usually accompanies the nodding, and often has a unilateral predominance, or may appear only in one eye. Its appearance in infants, in the absence of other neurological signs, and without impairment of vision, is sufficient evidence upon which to base our diagnosis. The nystagmus may precede the head-shaking by weeks or months: rarely it may be absent.

DIFFERENTIAL DIAGNOSIS. This condition must be distinguished from congenital nystagmus, reflex nystagmus, voluntary head-rolling of infants, and infantile epilepsy.

Congenital nystagmus may be due to blind-

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ness from any cause, to errors of refraction, or to organic disease of the central nervous system, especially hydrocephalus. These conditions may be ruled out by careful neurological and ophthalmoscopic examinations.

Reflex nystagmus is usually associated with intestinal disturbances or acute infectious diseases, which are not present in true spasmus nutans. Proper treatment of these conditions causes prompt disappearance of the eye symptoms.

Voluntary head-rolling of infants is a coarser movement, usually taking the form of deep bowing, and is easily differentiated.

Infantile epilepsy is usually associated with spasms of the trunk as well, and these movements are present only during attacks.

TREATMENT. When associated with malnutrition or rickets, proper measures should be taken to improve the nutrition of the infant, this being accomplished chiefly by proper adaptation of the food and improvement of hygiene, if this is defective. Codliver oil is useful in combating a rachitic tendency.

REPORT OF CASE.

P. C., six and one-half months old, was the third child of healthy parents. He was born at full term after normal delivery, and weighed nine and one-half pounds. He was circumcised under ether anaesthesia when ten days old. He was breast fed entirely for several weeks, after which time complementary feeding with modified cow's milk was instituted. A few weeks later he was weaned on account of failure of the mother's milk. The food always agreed with him well, and he gained regularly in weight without suffering from any intestinal disorder or disease of any kind. At the age of six and one-half months, on March 8th, the mother noticed nystagmus of the left eye, which was followed several days later by a less intense nystagmus of the right eye. On March 22, a rotary movement of the head developed. All of this took place without any digestive upset or other symptoms.

PHYSICAL EXAMINATION. The infant was quite large, well nourished and developed, and appeared bright and happy. He seemed to be interested in his surroundings, grasped for objects and appeared mentally normal. The fontanelles were neither bulging nor depressed, and the head-chest ratio was normal. Pupils were equal and reacted to light. There was a rapid lateral nystagmus of both eyes, more pronounced in the left, and of a rate of about

eighty to the minute. This sign disappeared when a finger or bright object was brought within a few inches of the infant's eyes, fixing his attention. There was a rotary movement of the head of rather wide excursion and varying in rate from forty to eighty to the minute. This movement was suspended when the child reached for a toy or concentrated on a near object. There was no rigidity of the neck. The tongue was clean; the throat normal. The heart and lungs were normal. There was no rosary. Abdominal examination was negative. There was a slight bowing of the legs. Reflexes were not increased. Temperature and pulse were normal, and the weight was 22 lbs. 4 oz. Examination of the eyes was made by Doctors Fisher and Henkel, March 15, with the following findings: The child had nystagmus. Examination of the fundus showed no pathology. Apparently the muscle balance of the eye was normal as far as could be ascertained. No measurement of the refraction was made.

TREATMENT. The infant was being fed on a proper diet consisting of modified cow's milk, cereal, vegetable soup, and orange juice. As this food was well assimilated and there had been no symptoms of indigestion and the increase in weight had been steady, it was considered entirely suitable, and no change was made in the diet. Although it was our impression that this case was not associated with rickets, yet, on account of the bowing of the legs, codliver oil has been given. No bromides or other drugs have been used.

PROGRESS. Examination May 19th showed no change in the infant's condition, except that the rotary movements of the head were much less extensive in their excursion, and the rate of movements was about sixty to the minute.

CONCLUSIONS.

1. Spasmus nutans is a condition which is easily recognized if the cardinal signs, nodding and nystagmus (together with the absence of all other signs and symptoms) are borne in mind.

2. A prompt recognition of this condition will save much unnecessary anxiety on the part of the parents, and embarrassment on the part of the internist.

DISCUSSION.

DR. CHAS. E. CONRAD, Harrisonburg: I agree with Dr. Robertson that the diagnosis of this condition is a great relief to the parents. I recently had a case which I saw first when the child was three months of age. It was then a feeding case. The weight was nine pounds. I saw it again at eight months,

when it weighed eighteen pounds. At eight months it showed decided rotary movements, nystagmus, and strabismus. Another interesting thing is that I found she showed some very marked indications of spasmophilia, well defined Chvostek and Trousseau signs. I gave her calcium bromide. I saw her again in two months and she showed no improvement. Since then I saw her about a month ago, eighteen months after the onset, and as far as could be seen the child was entirely well except for slight internal strabismus. The people, on account of another child in the family having a severe nervous condition, were very much disturbed. There was complete recovery except for slight internal strabismus as stated above. I gave calcium bromide and the child got along all right, but I do not know if it had any effect except on the spasmophilia. In this case there was no question of darkness as a cause, the rooms being well lighted.

FURTHER REPORT ON SPINAL ANESTHESIA*

By W. CALHOUN STIRLING, M. D.,
Genito-Urinary Surgeon,

and

CHAS. S. LAWRENCE, M. D., F. A. C. S.,
Winston-Salem, N. C.

There are certain requirements which an anesthetic solution must fulfill in order to satisfy conservative surgical judgment, some of the most important of which are: 1. Complete loss of pain sense; 2. Relaxation of the abdominal muscles; 3. Reduction of shock to a minimum; 4. Disturbance of the cardio-renal organs as little as possible; 5. Allowance of sufficient time for careful operation; 6. Lessening of the post-operative morbidity; 7. Maintenance of the acid-base equilibrium of the blood as near normal as possible.

In advocating the use of spinal anesthesia, it is not claimed that it is a panacea for all anesthetic ills, but realizing the limitations of any form of anesthesia, it is claimed that it fulfills a very definite field in surgery. It is the purpose of this discussion to take up these seven factors, and as briefly as possible, to compare the results produced by the three most commonly used anesthetics; i. e., ether, gas-oxygen and spinal.

At the Lawrence Clinic, we have given one hundred and forty spinal anesthetics, with no mortality and with less than five per cent untoward reactions during operations, and none following them. Based on our own observation, as well as the literature, and seeing the results obtained by others, we believe it is as safe as either gas-oxygen or ether, if used judiciously. Unfortunately in the past, the reports of the surgical literature have given it

an unsavory name, due not to the principle *per se*, but to the failure to acquaint oneself with the anatomy of the area to be anesthetized, together with the pharmacological action of the injected drug; also the various drugs used in the past have had a higher degree of toxicity than the solutions used at the present time. It is only on the reports of skilled operators, using it in a large series of cases, that an unbiased opinion can be formed as to its merits. Babcock reports over 6,000 successful anesthetics, Yount reports 7,000, Jonnesco has given 5,016, Chute something over 328, Labat reports over 200, and Smith of Boston has given 100. Including this and other reports there are over 18,000 spinal anesthetics reported, with only one death, that being before the solution was injected. What further corroborative evidence do we need to satisfy ourselves as to its non-toxicity? More careful study of the technique of giving it, as well as the desired action required, i. e., just where anesthesia is wanted, will in the future make this method of anesthesia more popular, with less reactions reported. There are many factors involved in the successful administration of a powerful drug in such a vital area, so its use should be confined to those who have carefully studied the method and can recognize any untoward reactions promptly, otherwise the literature will continue to report unsatisfactory results and condemn it without justification.

In this series, five per cent of the cases required a small amount of ether to divert their attention, so called "psychic ether," as other signs pointed to good anesthesia. In six cases, it was necessary to completely narcotize the patient, as the loss of pain was not obviated. This was in the first few given and we are glad to say that in the last fifty anesthetics given, there has been no complaint, showing that it is necessary to thoroughly acquaint oneself with the procedure before condemning it. There has not been any severe reactions in any case, such as is reported by certain authors. As a rule we give it and go on with the operation; rarely has it been necessary to administer any stimulant to offset an undue reaction. Some writers have criticized this procedure on the ground that the patient was made more nervous at being present at his own operation. This has been overemphasized, as it has been found that a hypodermic of morphine and scopolamine given one hour before the operation will relieve this anxiety and the patient

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is usually indifferent to any manipulation that he may receive.

Muscular relaxation with spinal anesthesia is all that one could desire, if the anesthetic is successfully administered, rarely requiring any retraction of the abdominal muscles, the abdominal wall can be literally lifted up and inspection made of the entire abdominal contents, lying quietly in a state of tonus, called by the French the "silent abdomen." This relaxation obviates trauma from retraction, which is an important factor in promoting rapid and uneventful healing. The intestines are in a state of tonus, rarely requiring packing off and extensive handling, with its resulting train of symptoms later recognized as ileus, tympanites, etc. Many prominent surgeons have said that they had never been able to get good relaxation with gas-oxygen, without giving ether with it; this has been the experience of the writer. Surgeons accustomed to spinal anesthesia, in the removal of adenomatous prostates, all declare that the relaxation and other features are much superior to gas-oxygen, its nearest rival in this particular work; with gas the anesthetist is urging the operator to get out, whereas with intra-dural anesthesia the operator can feel sure of an hour in which to do a careful dissection and leave the field dry. With the former the breathing is labored, the muscles are in a state of partial rigidity and the time element plays an important part in the operation. A very interesting point in this connection is the marked physiological action that pituitrin exhibits on the involuntary muscles of the gut, combined with spinal anesthesia. Recently, in a case of peritonitis resulting from ruptured appendix, operated on by one of us, the bowels had not moved in three days previous to entry in the hospital; on examination, no peristaltic movements were detected, the abdominal walls were tense and badly distended with gas. After the abdomen was opened, the patient was given one ampoule of pituitrin; in less than two minutes there were active peristaltic waves along the intestines, the patient passed much gas and fecal matter and, after being given another ampoule, more gas and fecal matter was passed and a large amount subsequent to operation. Patient left the table with the abdomen flat, and there was no vomiting later. It is a common occurrence for the patient to pass feces on the table and after returning to the room; this is a definite aid in

these cases of ileus and other paralytic conditions of the bowels. It is to be recommended in cases of intestinal obstruction where no definite cause can be ascertained.

Crile, in his excellent work on "Shock" has shown that spinal anesthesia will prevent shock. He attributes shock to two conditions, where hemorrhage and other causes that do not ordinarily enter into the cause can be ruled out. It is a bombardment of the brain with nervous impulses, coming from two sources, the first a result of over-stimulation of the brain due to operative injury, the second a result of psychic disturbances coming from fear and other psychic influences. With ether the psychic factor can be obviated, but the operative injury is even more the cause of shock, while with nerve block, i. e., spinal anesthesia, all impulses from the field of operation are prevented from reaching the brain, and the psychic phase is controlled with morphine and scopolamine; this is "anoci-association par excellence." In this report it has frequently been observed that a patient will go through a major operation with no shock, shown by the pulse rate and other signs, even in procedures like a panhysterectomy, or a prostatectomy on a very aged man.

The urine is examined before, as well as after, operation to see what influence the anesthetic plays on the renal tissue, and it has been noted that in no case has any toxicity been noted following the operation, evidenced by casts, albumen, etc. McNider has shown the depressing influence that ether has on the renal tubules, with an increase in the stainable lipoid material in the collecting tubules, with a diminution in the phenolsulphthalein output, and an increase in the blood urea and creatinine. Cabot and others say that the toxic influence that novocaine exerts on the kidneys can be disregarded; this has been our experience. There is no class of patients whose cardio-renal organs needs as much rest, as the prostatic, so, if we can devise a method of giving the prostatic drainage, without undue work being thrown on the already diseased organs, it behooves us to do so, if the patient is to receive the best management. Uremia is one of the chief causes of death following this operation, due in a large measure to the added work thrown on the kidneys, so, if we can spare the patient this strain, it rests on the operator to do so.

Pneumonia following a general anesthetic is a complication in two per cent of all cases, quite a factor in increasing the death rate in post-operative conditions. With spinal anesthesia, there is here, just as there is with the kidneys, no extra strain on the lungs and, if the septic factor be eliminated, we should not have any complications in the lungs.

The duration of this method of anesthesia varies, depending on the weight of the patient, age, and disease, usually lasting from fifty to ninety minutes; as a rule, an hour can be safely relied on for complete anesthesia as high as the abdomen, and an extra ten or fifteen minutes in perineal work. The anesthesia resembles the tide somewhat, slowly diffusing upward to the highest point of the subarachnoid space, with less concentration at that point, then gradually receding, so that the upper level of anesthesia is of the shortest duration and the lower level has the longest duration, as well as the deepest anesthesia. In doing a major and minor operation, the perineal work can be done without discomfort, after the patient begins to complain of pain in the upper incision. Using spinal anesthesia for its nerve blocking value, it has been combined with ether in cases where it is not feasible to depend on it alone, to obtund the pain sense, in extensive traumatizing accidents.

The morbidity following the operation has been greatly lessened in our series; there have been very few cases with nausea or vomiting, very few cases having any unusual accumulation of gas requiring measures to relieve it. The patient can take fluids before, during and immediately after the operation, making it unnecessary to give fluids by the rectum, and under the breasts, where the body fluids are depleted. Only one case has had a severe enough headache to cause comment, lasting two days and requiring nothing but slight elevation of the head to relieve it. No other untoward symptom such as meningeal irritation, etc., has been seen in any case.

It has been shown that the hydrogen-ion concentration of the blood is seriously disarranged in ether narcosis, due doubtless to the toxic effect it exerts on the kidneys—a most important factor in maintaining the equilibrium of the blood plasma at a constant physiological level, necessary to insure a prompt and uneventful recovery. This is not disturbed in spinal anesthesia.

The oldest patient was eighty-one and the youngest six years old. As a rule children stand spinal anesthesia well, if not too neurotic in temperament. The toxicity of the injected solution is, in our opinion, the result of direct absorption and not the result of upward diffusion of the novocaine, as claimed by some writers for, if the latter were true, we would expect to get more paralyses, especially that of respiration, which has not been seen in any case. Smith of Boston, has shown that the sharp drop in arterial tension is a result of the splanchnic centers being paralyzed; the higher the drug diffuses, the more the blood pressure drops, so that this must be kept in mind in trying to get anesthesia above the costal margin; if the area of anesthesia reaches above this point, there is usually a sharp drop in blood pressure. Blood pressure readings are made every ten minutes throughout the operation and, as long as the patient breathes regularly and deeply, no significance is attached to a moderate drop in the tension. If there is any sign of air hunger or marked restlessness, the patient is promptly given ten minims of adrenalin subcutaneously, which usually causes a prompt reaction; good results have also been obtained with caffeine in four grain doses for this condition, though it is rarely seen. Just after the spinal puncture is made, the patient is given one c.c. of pituitrin, as it is believed to aid in stabilizing the arterial tension. Re-breathing, using a closed inhaler, is valuable in cases with respiratory distress, supplying additional carbon dioxide, which will stimulate the medullary center. The patient must be closely watched by some one to see that he breathes regularly, as at times he forgets to breathe. This point must be watched very closely.

The contra-indications to this method of anesthesia are: 1. Patients with marked hypotension in shock where the pulse is very weak; 2. In cases of general septicemia; 3. In neurotic prejudiced patients; 4. In marked deformed spinal column disease; 5. In fevers of indefinite origin; 6. In diseases interfering with respiration, such as tumors, etc.; 7. In very obese patients with short diaphragmatic breathing space; 8. The aged and debilitated should be given small doses.

The indications for this over other forms of anesthesia include: Diabetics requiring operations, in patients with renal impairment, in

lung complications such as tuberculosis, and in acute coryza, requiring emergency operations. It is well tolerated in cardiac cases with compensation, and is indicated in all amputations on the lower extremities. As has been said, all genito-urinary operative cases stand it well with the possible exception of kidney cases; experience shows that traction on the renal pedicle will as a rule cause pain, though I recently operated on a patient with nephroptosis under local anesthesia, with very little discomfort.

The extent of the upward diffusion of the drug, when injected into the subarachnoid space, depends on several factors, some of which are under our control, these being, first the space through which the solution is injected, second, the amount of pressure used to inject it, third the position of the patient after receiving the drug, fourth, the amount of spinal fluid withdrawn, and last, the dilution of the anesthetic. The factors which cannot be controlled are, the natural diffusibility of the anesthetic solution, and the normal circulation of the spinal fluid, which is toward the periphery. These six things must be kept in mind in doing a spinal puncture as they are the controlling factors in keeping the blood pressure from dropping too much, as well as protecting the bulbar centers from the anesthetizing solution.

Various drugs have been used from time to time in this work, such as cocaine, tropococaine, apothesine, stovaine and novocaine. Our experience has been limited to the latter drug, as we believe it to be the least toxic. Novocaine hydrochlorid in minute crystal form is the drug of choice, and is put up in sealed ampoules in sterile crystals, of certain dosage; it has been found that ten and twelve centigram doses will satisfy all demands. Following the technique of Labat, somewhat, the dosage depends on the age and weight of the patient, a safe rule being to give one centigram for each ten pounds body weight. Adrenalin has not been used in conjunction with novocaine, as it causes a more marked drop in the blood pressure.

Briefly, the technique is as follows: One hour before the operation, the patient is given a quarter grain of morphine and one one-hundredth grain of scopolamine hypodermically and, by the time the patient enters the operating room, all nervousness is usually gone, and the patient is resting quietly. The patient

is placed in a sitting position with the back bowed well forward, the head resting on the chest, the lower spinal region is sterilized with iodine, and the iliac crests are located. A line drawn between these points crosses the fourth lumbar process. From this landmark the space to be injected can be located and, using a flexible twenty gauge needle, the spinal puncture is made, after anesthetizing the skin with one per cent novocaine. The needle is introduced in a slightly upward direction; a slight give can be felt when it penetrates the dura. The obturator is now withdrawn, so that when the needle enters the canal, clear fluid will drop from the needle; enough fluid is collected to dissolve the novocaine crystals. Then from ten to twenty c.c. of fluid is collected and discarded, the amount depending on the height of anesthesia desired, as well as the spinal fluid pressure. The dissolved novocaine is drawn into a five c.c. glass syringe and, after connecting it to the needle, the drug is gently introduced into the subarachnoid space, injecting a small quantity, aspirating more fluid in the syringe, and in this manner gradually emptying the syringe. An important point in the technique at this juncture is to make sure the needle is properly placed in the canal, for, as has been said, in connecting the syringe, the position of the needle may be altered, and thus cause a failure to get anesthesia (by aspirating fluid into the syringe several times the proper position of the needle may be insured). After withdrawing the needle, the patient is placed in the recumbent position (or any position desired), and the head well supported on pillows. The Trendelenburg position may be used if desired, or the patient turned over, if an operation is to be done on the back. Anesthesia above the costal margin is less satisfactory, the danger increasing in proportion to the height desired above that point. It is the refinements of technique in administering spinal anesthesia that give the most satisfactory results and, to attempt to give it without acquainting oneself with the above enumerated factors is to spell disaster and condemn it without justification. It is not our intention to leave the impression that a particular anesthetist is necessary, as any surgeon can give it, if careful study is made of it and the fact kept in mind that a powerful drug is introduced into a vital area. If the *modus operandi* is not thoroughly understood, the patient is subjected to an un-

necessary danger and an otherwise valuable method of anesthesia is discredited.

RESUME.

1. Spinal anesthesia, while not a panacea for all anesthetic ills, is a valuable adjunct in surgery below the costal margin.

2. Careful study of the pharmacological action of the injected drug, as well as of the anatomy of the area where anesthesia is desired, will lessen the number of failures and prevent any unnecessary reactions.

3. It is the anesthetic of choice in genito-urinary surgery, with the possible exception of the kidney.

4. The morbidity is greatly lessened: very few patients have complained even of a headache following the operation and there is less distention and vomiting.

5. Patients who have taken spinal anesthesia are with one accord very enthusiastic over it.

6. It is easy to inject and, if carefully watched, one accustomed to give it rarely has any trouble at all.

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A CASE OF ACUTE MASTOIDITIS COMPLICATED BY FACIAL PARALYSIS. OPERATION. RECOVERY.*

By E. U. WALLERSTEIN, M D., Richmond, Va.

Mrs. Mary L., white, widow, age 53, was first seen on July 12, complaining of a discharging ear.

The past history is unimportant except that her general health was good and there had been no previous ear trouble.

The present illness began with a coryza five

days ago. The right ear became painful, and increasingly so, until the drum spontaneously ruptured, producing a small amount of bloody discharge. This increased in amount and became purulent. Three days later the patient was first seen. At this time she had a discharging ear, tinnitus and impaired hearing. There was an absence of pain.

Examination revealed a medium sized, stellate perforation at the umbo and a moderate amount of discharge. The case was apparently one of simple otitis media. As there was sufficient drainage, no incision was made. The patient was instructed to irrigate the ear and instill mercurochrome 4%. Within a few days the drum picture began to clear and discharge diminished. However, slight purulent discharge continued and, two weeks after the first examination, the patient complained, that within the last two days her face had felt "stiff" and had become paralyzed on the right side.

There was now a complete right facial paralysis. All branches of the nerve supplying the facial musculature were involved. Neurologic examination of the other cranial nerves was negative. The patient had no pain, the mastoid was not tender to pressure and the drum picture was not that usually found in mastoiditis. The drum was incised at this time, in the attempt to provide freer drainage. X-ray examination showed a cloudy mastoid but no breaking down of the cells.

Within a few days sagging of the posterior-superior canal wall developed and the discharge increased in amount. The temperature remained constantly around 99.5 and the facial paralysis continued.

On July 30th, eighteen days after first examined, the patient was prepared for operation.

The laboratory findings at this time were: Wassermann, negative; Hemoglobin, 85%; W. B. C., 11,000; P. M. N., 83%; urinalysis, trace of albumin.

Operation was done under ether anesthesia. On opening the cortex, a pneumatic mastoid was found. The cell-lining mucosa was thickened, but there was no bone necrosis until a number of cells were reached about one-half inch from the mastoid tip along the posterior canal wall in close proximity to the course of the facial nerve. These cells were broken down and about one-fourth drachm of pus was

*Read before the Richmond Academy of Medicine and Surgery, October 9, 1923.

obtained. No direct connection could be demonstrated by the probe between these cells and the facial canal.

The antrum was located and freely exposed. On careful inspection of the antrum floor, no dehiscence or necrosis of the facial canal could be found. Culture of the pus from the mastoid cavity, obtained at operation, showed a pure culture of pneumococcus—type not determined.

The recovery from the paralysis was rapid. Within three days the patient could partially close the eye on the affected side. On smiling, the face was still pulled to the healthy side. Within ten days after operation the only evidence of a facial paralysis was a slight difference in the naso-labial folds of the two sides. This gradually disappeared, the hearing returned to normal, and the patient was discharged as cured thirty-four days after operation.

As to the underlying pathology: Due to the fact that recovery from the paralysis was so rapid and that there was no demonstrable dehiscence or necrosis of the facial canal wall, the paralysis was probably due to edema within the canal, which quickly subsided as soon as all infectious material was removed.

The case did not offer difficulty in diagnosis since the middle ear disease was present. However, at times there is difficulty in distinguishing Bell's palsy from facial paralysis of otitic origin. Cases are on record of paralysis due to ear involvement in which the drum picture was normal. The apoplectiform character of Bell's palsy usually serves to differentiate it from paralysis complicating otitis media. In the latter condition the onset is gradual.

Facial paralysis complicating acute otitis media is more common in children than in adults since a dehiscence of the facial canal is more frequently found in children.

The occurrence of facial paralysis in chronic otitis media is of dire significance as it points to such conditions as necrosis of the canal wall, cholesteatoma, involvement of the internal ear, brain abscess, or meningitis.

In acute otitis media, facial paralysis is a relative indication for operation; in chronic otitis media it is an absolute indication.

THE SIGNIFICANCE OF THE EARLY UROLOGICAL LESIONS.*

By W. T. GAY, M. D., Suffolk, Va.
Junior Surgeon and Urologist to Lakeview Hospital, Suffolk.

In this brief paper I will not attempt to give any new or heretofore unknown facts. Prompted by the frequency with which we see urological lesions that have progressed to an incurable or dangerous condition because these early symptoms appeared to be so trivial or transient that the true condition was overlooked, even though our improved laboratory methods and instruments of diagnosis probably enable us to make a more correct, positive and localized diagnosis than in any other branch of medicine or surgery of the internal organs; and because these far advanced urological lesions often present such a pitiful and hopeless condition, accompanied by such untold suffering, I will attempt to briefly consider a few of the more important early symptoms.

In studying for the cause of any urological symptom, the matter of first importance is to get a complete history and make a thorough and complete physical examination, especially looking for evidence of tuberculosis, syphilis and focal infection. Probably the most common symptom with which we have to deal is some derangement in the act of urination. Difficulty in the act may vary from a diminution in the size of the stream to a complete obstruction, either of which may come on gradually or suddenly, depending upon its cause, which is variable. We should first determine the presence or absence of stricture, and of a foreign body such as stone, then a rectal examination of the prostate noting any abnormality of its size, shape and consistency. Here it is well to remember that the encroachment on the sphincter is not always in direct proportion to the size of the gland and we may have a very definite prostatic obstruction without any marked palpable enlargement of the gland as determined rectally.

If we are unable to determine the cause thus far, then a cystoscopic examination is necessary to confirm or eliminate some inflammatory condition or polypus in the posterior urethra, or the presence of a vesical stone acting as a ball valve obstruction, or the enlargement of the prostate which could not be detected rectally.

*Read before the Southside Virginia Medical Association at Suffolk, March 14, 1922.

The cause for painful, burning urination may be local or from some constitutional condition which may cause some change in the chemical composition of the urine, such as the fevers and diabetes. Of the local causes may be mentioned obstruction, urethral or vesical calculi, inflammations of the urethra and bladder. Cystitis, except traumatic from instrumentation, catheterization, etc., is probably always secondary to infection elsewhere, and we should not be contented until we have found its origin either in the lower tract, the kidneys, or some focus outside.

Frequency may be due to an increased output as in diabetes, to nervous excitability or spinal lesions, to prostatic enlargement or new growth in the bladder, or it may be due to purely local conditions, such as urethral and vesical irritation. It is to be remembered that in the young adult frequency, first by day and later nocturnal, is often the first and only symptom of renal tuberculosis. For this reason we should always give the symptom of frequency a careful consideration and not be satisfied until we have utilized all known means to locate the cause early, when treatment can offer the best hope of relief.

Pyuria is probably one of the most frequent urological symptoms and at the same time one of most vital importance. We will exclude pyuria of acute urethritis, which with the other symptoms of acute inflammation is self-evident, and consider the more chronic types. When pus is found in the urine, much information can be had by the three glass tests which tells us whether the pus is coming from the anterior urethra, or from the prostate, or whether it comes from the posterior urethra and beyond. When this method fails to locate the source, a cystoscopic examination is called for. We may find the pus due to some obstruction in the urethra, causing back pressure with a secondary cystitis. It is not uncommon to find that a vesical calculus or diverticulum is present to cause a more or less permanent pyuria. Not being satisfied with the findings in the bladder, we must next investigate the ureters and kidneys. When pus or pus and blood is found coming from the ureters, we have just begun the examination and work from now on is to determine its cause. This we must do by examination of the pus to determine the type of infection, and by func-

tional test to determine the degree of damage to the renal structures. When indicated there should be an X-ray examination of the kidneys and ureters, both before and after the injection of some opaque media, such as the silver preparation, or preferably sodium bromide solution, to determine the presence of a stone, a dilated or kinked ureter, a dilated pelvis, renal destruction, or new growth.

Hematuria, however slight or transient it may be, is a symptom that demands a thorough investigation to determine its source and cause. It arises from a great variety of causes and may come from any part of the genito-urinary tract. Clinically, hematuria may vary from microscopic blood to the proportion of a severe hemorrhage. If due to an inflammatory condition, it is characterized by pain and pus will be found in the urine. But often hematurias are unaccompanied by any degree of pain and these cases constitute a very important group because, being free from pain or having perhaps very slight and transient pain, they are not investigated as they should be. For example, the bleeding from a papilloma or a malignant disease of the bladder is often the first and only symptom of these lesions and intervals of months or even years may elapse between bleedings. The patient in the meantime has acquired a false sense of security, believing that he has been entirely relieved, only to find on the recurrence of hemorrhage that his disease has progressed from one which could have been relieved to that of an incurable condition.

By the two or three glass test we can tell whether the blood comes from the anterior urethra or beyond. When it is uniformly mixed with the urine, its source can only be detected by cystoscopic examination. Symptomless hematuria of either vesical or renal origin may be continuous or intermittent and, if on cystoscopic examination the source cannot be localized in the bladder, ureteral catheterization is called for and it must be remembered that renal hematuria can only be detected when it is active. If not bleeding at the time of the examination, then it is necessary to re-examine during its active stage.

In conclusion, always consider hematuria, however slight or transient, a serious condition until proven otherwise.

Remember that a symptomless pyuria may mean a chronic pyelitis which, if unrecog-

nized and untreated, may lead to a more serious condition—pyonephrosis—with complete destruction of the kidney and even, perhaps, its fellow of the opposite side.

REPORT OF CASE OF FRACTURE OF ELBOW FROM THROWING BALL.*

By CHAS. M. HAZEN, M. D., Richmond, Va.

The Academy may recall some radiograms of elbows previously shown in which satisfactory results of treatment eventuated in difficult cases.

In the present report the interesting feature is not so much the corrective procedure, but the etiology, which is somewhat unusual.

We are told in the text-books that "The humerus may be broken by direct or indirect violence, like the other long bones; but also the humerus is more frequently fractured by muscular action than any other bone of this class. It is usually the shaft, just below the insertion of the deltoid, which is broken."

I find in the *Journal of the American Medical Association*, May 23, 1918, reference to the *Progres Medical of Paris*, in which Dr. Senlecq reports a "Fracture of the Humerus from Throwing Hand-grenade," and the comment, "Since Phelip reported in 1916 a case of this kind, five similar ones have been encountered. The fracture is in healthy men as they throw the grenade by hand. The bone breaks obliquely into three overlapping pieces, as Senlecq shows by a radiogram. Vautrin's patient was an American soldier and the fracture occurred while he was playing ball. Consolidation was not complete until the end of the fourth month. In the other cases one month generally sufficed."

Nothing is said of the exact location of these fractures—of the shaft, of course—whether near elbow, or higher. It is remarkable if in all six cases there were three pieces.

In the case which I am reporting it is the internal condyle of the humerus which has suffered and we are dealing with an *elbow* injury, so classified for study and treatment. The damage is slight compared with that previously described, but not unlike what commonly happens from falling on the arm. The lateral radiogram reveals practically nothing, the anteroposterior shows fragmentation with

some displacement. (The mechanism of the Jones' position will reduce this perfectly).

The points in the diagnosis, without the X-ray, of separation of the internal condyle are (Cotton): "Intact (passive) mechanism of the joint; lack of lateral play in the joint; local tenderness and swelling; thickening at a point near, usually below, the proper site of the epicondyle; sometimes a loose fragment can be made out; pain on active use or on passive stretching of the superficial flexors."

A word here as to the nomenclature and exact anatomy, quoting from Gray: "By some writers the external condyle is called the *external epicondyle* and the internal condyle the *internal epicondyle*." "The external epicondyle (*epicondylus lateralis*) is a small, tubercular eminence, less prominent than the internal, curved a little forward, and giving attachment to the external lateral ligament of the elbow-joint, and to a tendon common to the origin of some of the extensor and supinator muscles."

"The internal epicondyle (*epitrochlea* or *epicondylus medialis*), larger and more prominent, and therefore more liable to injury than the external, is directed a little backward; it gives attachment to the internal lateral ligament, to the *pronator radii teres*, and to a tendon common to the origin of some of the *flexors* of the forearm. The *ulnar nerve* runs in a groove at the back of the internal condyle."

The muscles which pull on the internal condyle produce flexion and pronation. The pronator radii teres arises chiefly from the tendon common to it and the flexors and the intervening fascia, as well as from the humerus just above the condyle and by a lesser head from the coronoid process of the ulna. The action of the pronator is to turn the forearm and palmar surface down.

The flexors arising from the internal condyle are the flexor carpi radialis, ulnaris, sublimis digitorum, and palmaris longus; the deeper muscles with the same functions arise from the bones and fascia below the elbow; they are the flexor profundus, longus pollicis and pronator quadratus.

Referring again to Cotton, "As a rule, the diagnosis is based upon the change in shape of the portion of bone left behind, with the disappearance of the 'hook,' and the changed relation of the ulnar nerve."

*Read before the Richmond Academy of Medicine and Surgery, June 5, 1923.

This author also concludes that, "The best guide to the success of reposition is palpation. Remember that the external condyle should lie a little higher than the internal and the olecranon only slightly behind the condyles. We may, while holding the fragments firmly, partly extend the arm to test the axis."

He also refers to the marked atrophy (presumably a late result) in the muscles arising from the internal condyle.

The patient in this case is an overgrown boy of 12 years and one would expect his rapid development of bone to favor such an injury. The ossification of the internal condyle begins at the fifth year, considerably earlier than the external, but union with the shaft is not so rapid and is affected at about the age of 18. These facts, and a study of the bodily movements involved in throwing, help to explain why this point should be the one to give way.



All of us have played baseball and a little reminiscence and experiment in the act of throwing, especially with the jerk used in pitching, will recall the strain which comes on the muscles attached to the internal condyle.

An analysis of the act discovers a series and

combination of muscular activities, beginning in the legs and extending to body, shoulder, arm, fore-arm, hand and fingers. A similar aggregation occurs in boxing, in batting, and in the "follow-through" of golf.

The body swings forward on the feet, bends at hips with shoulders moving forward; body twists to side throwing shoulder across, arm swings from shoulder, elbow bends in flexion, forearm pronates, wrist bends flexing hand, fingers flex; ball is delivered.

It is apparent that this maneuver of the body as a whole is in essence flexion and pronation of all the parts which co-operate; it is also evident that the greatest strain, the result of the accumulated momentum of all the combined muscular action, will be felt by the snapper of the whip, which is the forearm and hand. Therefore, the point of greatest strain is the shaft and internal condyle of the humerus, from which arise flexors and pronators.

It may be noted in passing that most pitchers exhibit exaggerated movement, raising the foot high in front before throwing, "winding-up" with shoulders and arms, a lot of "body-English"; most of this is intended to deceive and disconcert the batter, to mask the direction and point of delivery, the rate of speed—like the ancient mask of the Japanese warrior, the stamp of the fencer's foot, the insulting jabber of the pugilist, the wearing remarks of the baseball coach.

The many pictures which are published of our national heroes will demonstrate the points of the argument that the internal condyle is a point which might be expected to be damaged by the muscular act of throwing.

SUMMARY.

Radiogram shows fracture—fragmentation of internal condyle of humerus due to throwing ball.

The mechanism of injury is explained as due to the pull on the attachments of flexors and pronator, not only by their own contraction but also as subjected to the whip-like effect of the whole movement of foot, knee, hip, the side-twist of body, the swing of shoulder, the bend of elbow, wrist, fingers.

Professional Building.

NASAL GANGLION NEURALGIA.*

By M. H. HOOD, M. D., Portsmouth, Va.

A deep feeling of profound regret, though born of a brief and local experience, that in the past, and to some extent at the present, patients with a neurosis of the nasal ganglion have been grossly neglected, and the wish to minimize this number of sufferers, prompts the presentation of this subject.

The patients who suffer either the few or the many and varied symptoms of nasal ganglion neuralgia are not so numerous as are those who present themselves with the more common complaints or diseases, as errors in refraction, tonsillitis, etc., and yet it should be just as humanely important, as scientifically so, that these rather unusual conditions, when presented, should be recognized, diagnosed and the proper therapy applied or administered, as should be in the ones of more frequent occurrence. For several reasons these patients should be, by far, more interesting: (1) Because they are more or less unusual. (2) Because they bear, and plainly present, in a striking manner, the unmistakable ear marks, signs and evidences of uncompromising pain and suffering in their faces and countenances. (3) Because a great number of them are cases of long standing, some of which still endure their torture, without any imbalance of their nervous mechanism, while others who have suffered more intensely have apparently experienced at least a partial imbalance of their nerve forces and, as a result, are frequently referred to us with a so-called nervous breakdown, or as neurotics, neurasthenics, or as those who have been "hipped," etc. Often the patient will inform you that he has consulted every available physician and specialist, and in some cases even the chiropractors, with no result or relief whatever, and they are conscious of the fact that they are the bugbears, meddlers, triflers, pests and naggers of the medical profession. (4) Because when you make an accurate diagnosis in these cases, you must relieve the symptoms at least temporarily and, if treated properly, a favorable prognosis can usually be rendered.

Prior to 1908 the knowledge of rhinologists concerning the nasal ganglion might have been perfect to the letter, according to Gray, Piersol and other recognized texts on anatomy. But

their interests and efforts to simplify and bring together both the anatomical facts and the principles of their physiology to the extent of identifying a singular or separate syndrome (a neurosis) of this ganglion, which might be amenable to treatment, other than excision of the ganglion itself, was utterly lacking. So far as I am informed, it was truly a branch of our speciality, the development of which was practically untouched. To those who grasped the possible idea, it was indeed a ripe and promising field for an unlimited amount of work, by all available talent. Since 1908 there has been more than a considerable amount of work done in this particular field; numerous articles have been written. It has been presented at the various medical societies and associations including city, county, state and national. It occupies a chapter in at least one book and the writer predicts that it will, in the near future, occupy its rightful place in the leading texts of our speciality. The author who has done more work and accomplished most in this special field is unquestionably Dr. Greenfield Shuder, Washington University Medical School, St. Louis, Mo., under whom it was my pleasure and privilege to take my post-graduate work in laryngology and rhinology and whose views I shall follow more or less closely in this paper.

ANATOMY.

The sphenopalatine, sphenomaxillary Meckel's, or the nasal ganglion, is one of the four small ganglia associated with the extra-cranial portion of the fifth nerve. Each of these ganglia is a recipient of three roots: motor, sensory and sympathetic. Investigation by various authorities apparently justifies the conclusion that these ganglia are properly recorded as belonging to the sympathetic group. The nasal ganglion consists of an interlacement of nerve fibres; in each are embedded numerous stellate sympathetic neurons. It is a triangular reddish gray body about 5 mm. in length and situated high up in the sphenomaxillary fossa in close proximity with the sphenopalatine foramen, just beneath the maxillary branch of the trigeminal nerve, but for practical purposes, just posterior to, and immediately above the posterior tip of the middle turbinate, from one or two mm. to nine mm. beneath the surface of the nasal mucous membrane.

*Read at the meeting of the Virginia Society of Otolaryngology and Ophthalmology in Richmond, April 18, 1923.

Roots: The sensory root consists of the sphenopalatine nerves, also axons of the sympathetic ganglion cells, and dendrites of the cells of the gasserian ganglion. The motor root is the great superficial petrossal nerve, a branch from the facial, and may also carry sensory fibres. The sympathetic root, the great deep petrossal nerve, is a branch from the carotid plexus. The two great petrossal nerves fuse at the middle lacerated foramen to form the vidian nerve. The vidian nerve joins the nasal ganglion, beside giving off nasal branches, and a branch to the pharyngeal ostium of the eustachian orifice receives a filament from the otic ganglion.

Branches: The ascending or orbital branches supply the sphenoidal and posterior ethmoidal air cells and the periosteum of the orbit. The descending branches supply the mucous membrane of all but the anterior part of the inferior portion of the inferior turbinate bone, and adjoining portions of the middle and inferior meatuses, the hard palate and its mucous membrane, the inner side of the gum, and the mucous membrane of the soft palate and tonsil, motor filaments to the levator palati, and azygos uvulae muscles. The internal branches supply the mucous membrane of the posterior superior portion of the outer wall of the nasal fossa, the roof and septum of the nose and that portion of the hard palate which lies posterior to the incisor teeth. The posterior branches or pterygopalatine supplies the mucous membrane of the nasopharynx in the region of the fossa of Rösenmuller.

Anatomical Relations: Practically all authorities seem to agree that the nasal ganglion is situated high up in the sphenomaxillary fossa and a great many agree that it is in close proximity to, or close to the plane of the sphenopalatine foramen. It is also in close relation to the walls of the sphenoidal sinus, regardless of the variations in the boundaries of the sphenomaxillary fossa, or the irregularities of the sphenoidal air cells whether divided into one or more compartments, or prolonged downward and forward, or downward into the pterygoid process, and in some variations it is as closely associated to the walls of the posterior ethmoidal cell.

In its relation to the lateral wall of the nose the nasal ganglion may be found as superficially as one to two mm. or as deeply seated

as nine mm. from the surface of the mucous membrane.

The nerves and ganglia which are and may be associated with the nasal ganglion should be the basis of possible explanation of referred pain in nasal ganglion neuralgia.

It is directly connected with the nerves in the greater portion of the mucous membrane of the nasal fossa, hard and soft palates and a great portion of the nasopharynx; also the mucous membrane of the post-ethmoidal and sphenoidal air cells, as well as the periosteum of the orbit through its descending internal and ascending branches, respectively. Hence, there is a possibility of pain referred through the ganglion to the root of the nose, hard and soft palates, nasopharynx, parietal eminence, occiput and orbit; also, the possibility of sympathetic manifestations or vasomotor secretory phenomenon in the nose, as in hay fever. It is directly connected with the maxillary nerve since its sensory roots are formed by the palatine branches from the maxillary. Hence, there is the possibility of referred pain being directed along the course of the second division of the fifth. It is directly connected with the vidian nerve through the fusion of its motor and sympathetic roots, the great superficial and deep petrossal nerves, which are branches of the facial nerve and carotid plexus, respectively. And in this manner it is also connected with the facial nerve and carotid plexus. The great deep petrossal nerve represents the association cord between the superior cervical sympathetic and the nasal ganglion. Anatomically, the fibres of the cervical sympathetic from the nasal ganglion pass downward by way of the vidian nerve and carotid plexus to the cervical sympathetic and give branches to the cervical nerves, and proceed finally to the lower cervical ganglion, which is in intimate connection and often fused with the first thoracic. These ganglia are in association, with, or often fused with the nerves, which in addition to supplying the neck, also make up the brachial plexus and supply the upper extremity.

From the evidence at hand, both anatomical and clinical, the following assumptions would seem possible and probably justifiable: (1) That neuralgic pain referred to the root of the nose, to the parietal eminence, to the orbit (deep seated) or along the upper jaw, is of nasal ganglion origin. (2) That the apparent

sympathetic syndrome or vasomotor secretory phenomenon of the nose, as occurs in hay fever, regardless of the season of the year, with the accompanying eye symptoms, originates in the sympathetic elements of the nasal ganglion. (3) That persistent itching of the hard palate, throat, or along the course of any nerve or ganglion with which the nasal ganglion may be associated, could originate in the nasal ganglion. (4) That neuralgic pain referred to the occiput, the neck, shoulders, upper extremities, breast, axilla or shoulder blade, is a vidian neuralgia originating in the sympathetic elements of the nasal ganglion, and that the path of the impulses is from the nasal ganglion through the vidian nerve, upper, middle and lower cervical, and first thoracic ganglia, through the last two of which pass the heart and lung fibres.

From a clinical and therapeutic standpoint we know that we can control many of the neuralgic pains about the eye where no pathology can be demonstrated, as blepharospasm, photophobia, and the like, by cocaineization of the nasal ganglion and by means of the same procedure we also know that the symptoms which accompany many pathological processes of the eye, as iritis, corneal ulcer, keratitis, etc., can be controlled. Since the ophthalmic symptoms with or without demonstrable pathology, in reference to the nasal ganglion, are only clinical and therapeutic facts, there is no positive anatomical explanation, so far as I am aware, but a reasonable assumption seems to be that these are referred pains or vaso-motor secretory manifestations from the nasal ganglion, but by way of what branches these impulses travel, no one has thus far been able to determine. A more complete knowledge of the anatomy and physiology of this apparent nerve mechanism is wanting.

SYMPTOMATOLOGY.

The symptoms occur in the form of syndromes, namely: The neuralgic, the sympathetic, or a combination of the two.

The Neuralgic Syndrome: Frequently the neuralgic symptoms appear following a mild, moderate or dreadful head cold or coryza. The pain begins usually at the root of the nose, in and about the eye, upper jaw and teeth, and sometimes the lower jaw and teeth are involved, and extends posteriorly along the temple, zygoma, about the ear including the mas-

toid process, with special emphasis of a tender spot just behind the mastoid process. Then it extends backward to the occiput, down the neck into the shoulder, and may continue throughout the upper extremity; or it may be directed to the shoulder, axilla or breast. The pain in the neuralgic syndrome seems to vary as to location, occurrence and severity. As to location, it may be present at any one or more, or even in all the anatomical regions, as mentioned above. As to occurrence, the attacks may occur day or night, without warning, and may last from a few minutes to hours, days, weeks, and in some cases it remains more or less constant. As to severity, in mild cases there may only be a sensation of tightness or drawing, or a sensation of the teeth being too long on the affected side, stuffy ears, aching throat, itching of the hard palate, stiffness or rheumatism of the neck and shoulders. In the more severe cases, the pain is described by patients as a ball of fire, a knife cutting, or a drill, drilling into some nerve; or like an electric current turned loose in the nose, eyes or head. This pain is excruciating and unbearable.

The Sympathetic Syndrome: This type apparently occurs with less frequency than the neuralgic syndrome. A history of the sympathetic syndrome coming on with, or following a coryza may or may not be obtainable. The most striking thing occurring in this syndrome is the vasomotor secretory phenomenon, which usually occurs in the following manner: During any season of the year, without any warning whatsoever, the patient is suddenly seized with sneezing spells which give rise to simultaneous congestion of the nasal mucous membrane and with an unlimited quantity of thin, hot, watery and irritating nasal discharge. The entire nose becomes red and congested. The ophthalmic disturbances appear immediately after the onset of sneezing. The conjunctivae become noticeably red and congested. The eyes may itch and burn. Lacrimation has already begun. Pupils become dilated, lids wide open, and the patient presents the appearance of staring. Photophobia may be marked even with the patient in a well darkened room. Near work becomes very difficult, if attempted. If these patients are properly treated, the symptoms usually subside immediately, not to return. If these cases go on and establish themselves into morning sneezing (rhinitis

nervosa, vasomotor rhinitis or hay fever), it appears to be a purely sympathetic syndrome. Often these patients who have sympathetic symptoms also suffer some of the neuralgic manifestations, but they will not consent to have their so-called rheumatism, stiffness of the muscles and neuritis of the neck and shoulders, or even any part of a lower half neuralgic headache connected in any way whatsoever with their morning sneezing. Following these cases further, Dr. Sluder says, "It appears that the syndrome becomes subdivided and betrays itself as single symptoms, namely: eye ache, ear ache, tooth ache, neck ache, etc., so it happens that the sympathetic symptom-complex may present a single symptom, sneezing, or eye disturbances which simulate low-grade conjunctivitis, with asthenopia." Dr. Sluder also says he has seen asthmatics of nasal ganglion origin, and proved it by cocainizing and injecting the ganglion, which relieved the asthmatic attacks immediately, and a few times he has seen a red external nose (rosacea) that was of nasal ganglion origin. Why in a neurosis of the nasal ganglion one group of patients will suffer only the neuralgic syndrome in its entirety or in part, another group will be victims of only the sympathetic syndrome, and still another or third group will be subjected to the symptoms of both the neuralgic and sympathetic syndromes, to any extent and degree, no clear statement has as yet been made.

DIAGNOSIS.

With the symptomatology as given above, present in part or as a whole, the diagnosis is practically completed or confirmed by the immediate cessation of all symptoms, as the result of cocainization of the nasal ganglion. This procedure should be repeated two or three times at separate sittings, when symptoms are at their height, to avoid error in diagnosis. In doubtful cases it should be repeated on several occasions and with constant findings only, as relief of all symptoms should be construed as evidence of nasal ganglion neuralgia.

It must be differentiated from sphenoidal and post-ethmoidal infections as suppurative and hyperplastic, which Dr. Sluder forcefully emphasizes is easily done by the results and effects obtained through cocainization of the ganglion. In a neurosis of the ganglion, all the symptoms are relieved in ten minutes, while in

sphenoidal and posterior ethmoidal infections it has no effect whatever, because the lesion is central to the ganglion, in which case intrasphenoidal applications of cocaine will relieve.

In the sympathetic syndrome, where the vasomotor secretory phenomenon predominates, as in hay fever, it has been the custom of Dr. Sluder and his associates first to have the patient desensitized to any given pollen or protein to which the patient may be sensitive. If he is permanently relieved, no other procedure is necessary. If it is found that the patient is not sensitive to any pollen or foreign protein, or if sensitive and the administration of the given pollen or protein does not relieve the symptoms, then the nasal ganglion is cocainized repeatedly, and, if relieved of the sneezing attacks by this procedure, the diagnosis of nasal ganglion neuralgia, sympathetic type, is rendered.

The recognition and diagnosis of the cause of a neurosis of the nasal ganglion would seem to appear as mechanical and as an extension of infection or toxins from infection: mechanical, as nasal obstruction or deflection of the nasal septum; extension of infection or toxins from infection, as coryza, especially in the region of the ganglion, or from sinusitis, as sphenoidal and post-ethmoidal.

PROGNOSIS.

The prognosis seems to be very favorable when an accurate diagnosis has been made, and treatment administered with equally as much accuracy and skill.

TREATMENT.

In a few of the mild cases, cocainization of the ganglion and the application of 2% solution of silver nitrate, or a 4/10% gaseous solution of formaldehyd to the sphenopalatine district one or two times weekly, for from two to four weeks, is of great value; and in some cases it seems to give permanent relief for both the neuralgic and sympathetic syndromes. For the more severe cases, Dr. Sluder injects, and recommends the injection of the nasal ganglion with $\frac{1}{2}$ c.c. of 5% phenol in 95% grain alcohol, after complete cocainization of the ganglion has been obtained. This procedure may give relief for years and it may be permanent; or in some cases the injection of the ganglion may be required as often as once a year.

In our small series of cases, eleven in all

who submitted to treatment and one who would not submit to treatment—neuralgic 7, mixed 1, sympathetic 3—we have not found it necessary to inject the nasal ganglion. While we are aware that such a neuralgia may be present without nasal obstruction, yet in the few cases under our observation and treatment, whether mild or severe, neuralgic or sympathetic in type, we observed a moderately or markedly deflected septum and always present only, or more marked on, the side of the deflection.

Treatment: Regardless of type or severity, with the exception of only the 12th case, our treatment has been the same. In this case cocaineization of the nasal ganglion and application of silver nitrate, 2%, to the sphenopalatine district was given on two occasions. This patient has a deflected septum but refuses operative procedure. She still suffers moderate attacks of nasal ganglion neuralgia. The treatment of our other cases has consisted of submucous resection.

Results: Six of the seven cases with the neuralgic syndrome have been completely relieved. The other case is 90% cured according to her statement. Two of the three with the sympathetic syndrome have been entirely relieved. The mixed case also has complete relief. The post-operative period in these cases varies from two months to two years and three months.

Only two and a half years having elapsed since my partner, Dr. L. Leroy Jones, and I have become interested in and worked on nasal ganglion neurosis, so we deem it unwise to draw conclusions. From our experience, however, we believe it as worthy of the conscientious efforts, further scientific investigation and professional skill of the ablest men in our speciality, as any subject within its scope.

Professional Building.

THE CIRCULATION IN THE INFECTIONS OTHER THAN ENDOCARDITIS, RHEUMATIC FEVER, AND SYPHILIS.*

By FREDERICK R. TAYLOR, B. S., M. D., High Point, N. C.

I was originally asked to write a paper for this heart symposium on myocarditis in the infections, but I have changed this title to the present one for two reasons—first, the exact meaning of the term myocarditis is somewhat uncertain, as some would include cloudy swell-

ing and other degenerative processes while others would stick to the etymology of the word and include only strictly inflammatory processes; and second, because many serious circulatory conditions during and after infections, even sudden death, are often quite as much vasomotor in origin as they are myocardial, though the myocardium is usually blamed for the situation. It seems unwise, then, to attempt to limit our discussion to the myocardium, and I believe it will be more profitable to consider the entire circulation as a functioning unit, and to speak of circulatory weakness or circulatory failure, rather than of pure myocardial disease.

I have excluded endocarditis because I understand that this large subject is to be handled in a separate paper, as it should be; and rheumatic fever, that great destroyer of the heart, though it usually produces a carditis, so frequently leaves its indelible marks in the endocardium, that we naturally associate the two conditions. Syphilis has been excluded because this society has so recently discussed it in a special symposium.

We will begin with the statement that from symptoms and physical signs it is often impossible to distinguish between a weak myocardium and an unstable vasomotor mechanism, though this should be done when possible. The electrocardiograph may help us in this matter, but I am not competent to discuss that, and most patients suffering from infections do not have access to that instrument.

One of the simplest evidences of the effect of the infections on the circulation is the character of the pulse in fever. We speak of the pulse frequency being in proportion to the temperature, but in the very next breath we begin to recite a list of exceptions to this rule, such as typhoid fever, smallpox, influenza, etc. This relation between pulse and temperature curves is a very useful observation, by no means to be cast aside, but it would probably be more correct, if we wish to generalize, to state, as Ivy Mackenzie does, that the pulse varies in fever, not according to the temperature, but according to the specific properties and affinities of the poisons which are generated, directly or indirectly, in the course of the infection. It has been observed that the slow pulse of typhoid fever is not accelerated by atropin, thus differentiating it from the pulse in many

*Read before the High Point meeting of the Guilford County Medical Society.

other diseases and in health. This is highly suggestive of the importance in certain infections of a toxic effect on the regulatory mechanism of the circulation as well as on the heart and vessels.

It has been well said that pathological anatomy is the groundwork of modern medicine, but there are many important circulatory conditions which it does not explain, especially certain transitory toxic symptoms. The best pathologists sometimes fail at post mortem to find an anatomic explanation of a death. Many well known chemical poisons, such as strychnin, morphin, nicotin, pilocarpin, etc., may kill quickly without leaving recognizable anatomic changes, and it is just as reasonable that toxic conditions resulting from infections often leave no anatomic trace.

Albuminous degeneration or cloudy swelling of the myocardium is very frequent in the infections, but we know little of its clinical significance.

We used to hear much of fatty degeneration and fatty infiltration, but again hear what Ivy Mackenzie has to say in his chapter on "The Circulation in Infectious and Toxic Processes" in Volume II of *Oxford Medicine*. He states that the clinical importance of fatty *degeneration* has been much overestimated in infectious and toxic states, and that it does not exercise a determining influence on the course of events. He further states that fatty *infiltration* has no association with infectious or toxic processes, though by its presence it may render the heart more liable to premature exhaustion in toxic states.

Waxy and hyalin degeneration of the myocardium are sometimes seen in special diseases, notably typhoid fever and diphtheria, where they may also occur in the skeletal muscles.

Necrosis may occur with septic infarction in pyemia, but this is of no special importance, as the whole body is then overwhelmed with a necessarily fatal condition. Brown atrophy, seen in advanced pulmonary tuberculosis, is also of no clinical importance.

In the strictest sense of the term, myocarditis is rare in the infections as a whole. It is the rule in acute rheumatic fever as part of a carditis, it is fairly frequent in diphtheria, especially when treatment is not given early, and it is occasionally seen in typhoid fever. Ivy Mackenzie describes an acute idiopathic myocarditis which runs a rapidly fatal course

typical of a general infection, with the only gross evidence of disease at autopsy in the myocardium. The condition does not seem to be widely recognized as a clinical entity, and I know nothing of it from personal observation.

Apart from chronic rheumatic infection of the heart and cardiac syphilis, chronic myocarditis in the strict sense of the word does not exist, though a fibrosis of the heart is common.

We must confess that we often cannot make any accurate estimate of the state of the myocardium in many acute infections such as pneumonia, scarlet fever, measles, smallpox, influenza, etc. In many of these the heart may be rapid or slow. The sounds may be feeble, but this is not necessarily evidence of myocardial disease. The heart sounds may be feeble in a syncopal attack, but syncopal attacks, with the exception of Stokes-Adams disease, are vasomotor in origin rather than myocardial. So the weak sounds in infectious diseases may be in part due to a disorder of the nervous mechanism regulating the circulation.

Certain cases of sudden death without dyspnea, cyanosis, or edema, during or soon after an acute infection, are commonly attributed to "acute dilatation of the heart." Acute dilatation of the heart without dyspnea or cyanosis is a difficult thing to explain and, when at autopsy we find a tremendous engorgement of the splanchnic vessels, and recall that during the fatal attack pallor and general collapse were the cardinal elements of the picture—in short, that the condition was absolutely typical of shock—it makes us pause to inquire if our long cherished views concerning heart failure in the infections are adequate. We dare not say that the heart was in no degree responsible, but surely the picture implicates the vasomotor mechanism, and we should really speak of death from *acute circulatory failure*, rather than call the whole process acute dilatation of the heart. The one is stating something that we know to be a fact, the other is assuming something we do not know and cannot prove to be true.

I will not say much about the arrhythmias in the infections, as the paper on graphic cardiologic methods will no doubt deal exhaustively with them. However, many types of arrhythmia should be recognized on physical examination. Sinus arrhythmia is of no importance,

and is usually easily recognized by the fact that the pulse becomes faster during inspiration, especially towards the end thereof, and slows during expiration, and especially during the pause following expiration. Extrasystoles are characterized by premature heart beats which often do not reach the radial pulse, followed by a compensatory pause which brings the pulse back into the dominant rhythm. A series of several extrasystoles in succession may be confusing, and require graphic methods to demonstrate their true nature. Extrasystoles *per se* mean nothing, but, taken in connection with other circulatory abnormalities such as valvular disease, arteriosclerosis, high blood pressure, etc., or in the presence of nephritis, may be of ill omen. Auricular fibrillation, characterized by a total irregularity of the pulse, absolutely without any dominant rhythm is common in a failing circulation, and is usually evidence of a damaged or badly fatigued heart muscle. Auricular flutter is hard to diagnose without graphic methods. John Hay gives the following criteria for the suspicion of it: a persistent steady pulse rate of 120 and over, not materially modified by rest, movement, or emotion, which, on the administration of digitalis, either shows a sudden marked slowing or develops an arrhythmia. A peculiar arrhythmia sometimes occurs in flutter that is highly suggestive, and that is, an alternating series of rapid and slow pulse beats, the fast ones being about double the frequency of the slow ones, without any relation to the respiratory phases, and without any compensatory pauses. I recently saw Dr. Henry A. Christian make a provisional diagnosis of flutter on the strength of this arrhythmia, and confirm it with an electrocardiogram, in a patient desperately ill with pneumonia.

Sir James Mackenzie has done us a great service in diverting our attention from the minutiae of murmurs to the vital question of the state of the myocardium, and the presence or absence of the phenomena of decompensation, but let us not be too insistent on focusing our attention exclusively on the myocardium. We must consider the whole circulation as a functioning unit, and ask not simply "What is the state of the heart muscle?", but "What is the state of the circulation?"

There is a syndrome common after any severe prolonged strain, frequently seen after the

acute infections, known under various names such as neurocirculatory asthenia, disordered action of the heart, irritable heart of soldiers, etc. Just what it is we do not know, but it is certainly not exclusively myocardial, it does have pronounced vasomotor features, and the nervous system may be affected in various other ways. The prognosis is good in the long run, but the condition is often an obstinate one.

Rest is the one prime essential in the treatment of the circulation during an acute infection. Little other treatment is indicated unless there is definite evidence of circulatory weakness. Someone will at this point no doubt raise the question of routine early digitalization of pneumonia patients. I do not have the slightest objection to it, and, indeed, commonly practice it, for it at least has the definite advantage of giving one time to find out whether one has an active preparation of digitalis or not. Other than this, with modern methods of rapid digitalization, the value of the method may be open to question. This may sound like heresy and, until recently, I should have stoutly supported the routine digitalization of pneumonia patients as essential, but let me quote from a letter received from Dr. Henry A. Christian dated June 28, 1921. He writes, "As to digitalization in pneumonia, I myself doubt its value. In my judgment it is not at all necessary now that with large doses we can get a quick digitalis effect. Herein is one of those curious happenings which we often see. In Cohn's work on pneumonia he found a considerable number of cases of fibrillation, etc., in his first 100 cases of pneumonia, and preached digitalis as a result. In his subsequent studies he found very few cases in which cardiac conditions arose likely to be benefited by digitalis. The latter has certainly been my experience." Again Dr. Christian writes on July 16, 1921, "Except for those cases of pneumonia developing auricular fibrillation or some other similar cardiac disturbance, or in those cases already having a cardiac insufficiency before the pneumonia, I personally do not think that digitalis will accomplish anything."

When definite evidence of circulatory weakness appears in an acute infection, we must try to consider so far as possible the type of disturbance confronting us, in order to give the most effective treatment. There are three types commonly met with.

1. Typical cardiac decompensation, with dyspnea, cyanosis, edema, etc. It is in this type that morphin and atropin given at the onset exhibit their happiest effects. This must be supplemented with digitalis, given until re-results are obtained. The initial dose of digitalis should be rather large though I confess I have never yet resorted to a single dose of a half an ounce of the tincture intravenously. Half a dram to a dram of the tincture, or 3 to 5 grains of the powdered leaves has seemed to me sufficient in most of my patients as an initial dose, and subsequent doses will be calculated according to the effect of the first one, being reduced as soon as a digitalis effect becomes apparent.

2. The second type of circulatory weakness encountered in the infections is that type above mentioned which presents a picture of shock, and the treatment is the treatment of shock—warmth, stimulation, intravenous saline containing adrenalin, bandaging the extremities, etc. However, as stated above, we cannot completely separate cardiac failure from vasomotor failure or other disturbance of the regulatory mechanism of the circulation such as vagal disturbances, etc., and during and ever since my service as resident physician in the Germantown Hospital, Philadelphia, it has been my practice in severe circulatory failure to give a variety of drugs in sequence, with the idea of working on various parts of the circulatory apparatus in succession, and avoiding over-stimulation of any one part. My usual scheme of treatment, which seems to have been justified, at least in some cases, by results, is to use four drugs in sequence, giving each drug every eight hours, so that the patient gets one or another every two hours. These drugs are digitalis, atropin, camphor, and caffeine. They may be given in any order, though it is well to have a dose of atropin due early in the night, and to combine morphin with it if the patient is restless. All except the digitalis are given hypodermically, and that is so given if the patient cannot take it by mouth. I have for years believed that better results can be obtained in this way in acute circulatory failure than by using a single drug, and this is in accord with the theory that the whole circulation fails rather than the heart alone. In addition to the drugs mentioned, if the patient is given to “sinking spells” which alarm the family,

there is no harm in giving aromatic ammonia at any time if he can take it, as its action is very fleeting. I follow Crile in believing that strychnin is harmful in shock or in acute circulatory failure of any kind.

3. Neurocirculatory asthenia persisting after convalescence from an infection is well established, requires different treatment than other forms of circulatory weakness. Here absolute rest is usually inadvisable. Judicious exercise, especially exercise enjoyable to the patient, such as that obtained from games requiring only moderate effort, is beneficial from both its physical and psychic effects. However, care must be taken to avoid over-exertion.

There is a possibility that the general asthenia so characteristically following influenza may be due to adrenal insufficiency, but in this endocrinomaniac age we must adopt the scientific attitude of the gentleman from Missouri. Again let me quote from a personal communication from Dr. Christian, dated October 17, 1921. “Finally, in regard to adrenal insufficiency in influenza, I do not think you will find anything about it in my chapter on influenza, (i. e., in *Oxford Medicine*) and I doubt whether there is any association. However, one of my associates brought up the point as, in studying some of the cases, he felt that there was a considerable number of patients who showed hemorrhages into the adrenal in cases of influenza. I do not know whether he ever went over enough cases and checked up these lesions to justify any final statement. The adrenal is an organ which lends itself rather easily to artefacts, and one has to be very careful in drawing conclusions from what you find in the adrenals at death. I pointed this out to him at the time. I will find out whether he did any more about it, and will keep my eye opened for descriptions of lesions in this organ.”

Since receiving this letter from Dr. Christian I have not seen anything further on this subject, so suppose it is still at least very doubtful whether adrenal insufficiency exists in these cases.

In closing, let me emphasize that I do not believe any routine scheme of treatment is applicable to all cases, and it is always necessary to meet individual needs as they arise. The best of care will not always prevent the Grim Reaper from harvesting in childhood, youth,

and maturity, by means of circulatory failure in the infections, but there is no greater joy than the realization that in an occasional case one has been privileged to stay his hand and restore to health a patient in the morning or the high noon of life, whose presence can for years to come be a blessing to his family and community.

PLEURISY—ITS ETIOLOGY AND SIGNIFICANCE.*

By L. F. COSBY, M. D., Abingdon, Va.

In making the above selection for a subject of this paper, I had several topics in mind when this idea came to me as being one of the best and most difficult subjects that I might have selected, so if I make many grave errors or misstatements, please be kind hearted and overlook them. As all of you gentlemen know, this is one disease that is most overlooked by the men in general practice, and the one that receives the least attention of physicians. How many of us pass up a case of pleurisy by not even examining the chest and by telling the patient that he or she has "intercostal neuralgia, nervous indigestion, or that it might be a touch of muscular rheumatism." The above facts, to which I plead guilty, proved the incentive that made me take the above subject for discussion.

Pleurisy or pleuritis is an inflammation of the pleural membranes that may involve their parietal, visceral or diaphragmatic coverings.

Etiology—The inflammatory signs may be confined to the pleura, in which case it may be spoken of as primary. The simplest form follows exposure to cold. In all probability the majority of these pleurisies are not primary but represent the localized flaring up of an old inflammatory process in the neighboring tissues of lung and glands. Photographs of the X-ray reveal the presence of old tubercular areas in the region of many pleurisies, wherein the ordinary methods of diagnosis present only the evidence of the pleural involvement. The tubercular pleurisy is always secondary to an older focus of infection.

Secondary pleurisy has its origin in (1) extension of inflammation from the lungs, especially in pneumonia, tuberculosis, pulmonary abscess and lung infarcts; (2) extension of inflammation from adjacent organs and struc-

tures, notably in pericarditis, mediastinitis, bronchial lymphadenitis, and following perforation of the diaphragm from liver abscess or cancer of the stomach; (3) metastatic infection from tonsillitis, articular rheumatism or general septicemia; (4) association with chronic diseases such as nephritis, leukaemia and gout.

The lung, enveloped as it is by the visceral pleura, is responsible for the greatest number of pleurisies. Nearly every form of inflammation of the lung involves the pleura sooner or later, whether it be pneumonia, tuberculosis abscess or infarct. Frequently the pleuritis is obscured by the overshadowing signs of lung inflammation, though the presence of pain is always indicative of pleurisy or pleural involvement.

Bacteriology—The exact determination of bacteria responsible for pleurisy is not always possible. The sputum and pleural exudate offer the best material for examination. But in both media secondary invaders may dominate over the original organisms. The bacteria commonly found are the tubercle bacillus, pneumococcus and streptococcus. Other organisms occasionally obtained from pleural exudates are Friedlander's bacillus, influenza bacillus, diphtheria bacillus, and typhoid bacillus. It is interesting to note that pleurisy is relatively rare in three diseases in which pulmonary complications are often present, influenza, typhoid and measles. The leukopenic characteristic of these infections may offer an explanation of this fact. Mixed infections of pyogenic organisms with tubercle bacillus are common and often, when cocci only can be found in the exudate, a primary tuberculous inflammation may be diagnosed by the general physical findings.

The morbid anatomy we will not discuss as all of you are familiar with the pathological findings in this disease.

Before going further, I would like to make a few remarks concerning the "Absorptive power of the pleura." The channels through which the products of absorption flow are the endothelial cells, lining the pleura, the lymphatics and the blood vessels. Fibrin is reduced to a state of liquefaction preliminary to absorption. Fluids are taken up under certain conditions by the blood and disseminated through various parts of the body. Experiments have shown that a hypertonic salt solu-

*Read at meeting of Sullivan, Johnson and Carter County, (Tenn.) Medical Society at Bristol, Va.-Tenn., June 1923.

tion introduced into the pleural cavity is followed by increase in the fluid content within a few hours. *Per contra* a hypotonic salt solution is rapidly absorbed.

Clinical Types of Pleurisy—The clinical course of pleurisy may end after the fibrinous stage, it may go onto the stage of effusion, or it may terminate in the formation of pus. There are usually three types of pleurisy recognized for descriptive and diagnostic purposes and these types are dry or fibrinous pleurisy, pleurisy with effusion, and empyema. In addition, there are a number of atypical forms which we will not discuss, being of lesser importance than the ones mentioned above.

Dry Fibrinous Pleurisy—Etiology: This condition is an inflammation of the pleura associated with an exudate of fibrin. The cause of fibrinous pleurisy in order of their frequency are the tubercle bacillus, pneumococcus and streptococcus. Nearly all of the dry pleurisies are of tubercular origin, a point that all practitioners should remember and bear in mind when treating a case of this kind.

Pleurisy with Effusion—This is an inflammation of the pleura associated with an exudate that may be serous, serofibrinous or hemorrhagic. *Etiology:* It is well to keep in mind that all the clinical types of pleurisy are arbitrarily classified. A dry pleurisy more often than not will yield a few drops of fluid, mostly serum to the exploring trocar. The terms employed are derived from the predominating elements found in the exudate, fibrin, serum, blood and pus. The factors determining the proportion of these elements are unknown or only partially understood. For lack of specific information we assume that the quality and virulence of the germ on the one hand and the individual reaction of the tissues on the other hand are chiefly concerned. But the type of inflammation that will be excited by a germ organism cannot be predicted. Thus the tubercle bacillus may cause a simple fibrinous, serous, hemorrhagic or purulent exudate. A pneumococcus pleurisy may terminate in the fibrinous, serofibrinous or purulent stage. The same variety of exudate prevails in pleurisies accompanying pneumonia and cancer.

The serous or serofibrinous effusion with an amount of fluid sufficient to give physical signs is generally of tuberculous origin. It is estimated that between seventy and eighty per cent of all cases are tuberculous. Only rarely

can the tubercle bacillus be recovered on a cover glass preparation or in the cultures, but the inoculation of guinea pigs with the fluid causes death from tuberculosis in a high percentage of the cases. Frequently too, an effusion occurs in association with tuberculous lesions in the lungs and bronchial glands. Serous exudates of the pneumococcus origin are less common than the fibrinous. They have a greater tendency to become purulent than the tuberculous forms and are usually more localized. Occasionally streptococcus effusions remain serous but all the pyogenic cocci show a disposition to pus formation.

It might be well at this part of the paper to take a little time and discuss the diagnosis of pleurisy with effusion.

The recognition of a primary serous pleurisy ordinarily presents little difficulty, because the physical signs are characteristic. The secondary cases need to be differentiated from pneumonia. Both effusion and consolidation give dullness and may exhibit bronchophony, but in the latter the viscera are not displaced. A thickened pleura is not always easy to distinguish from pleural effusion, and the two conditions may both be present. Exploratory puncture will clear up the diagnosis. Puncture is also necessary to definitely diagnose a small or circumscribed exudate. A tumor mass may give rise to flatness on percussion and its presence is often suspected for the first time after a dry tapping, a point well to be remembered.

Empyema is a pleurisy with purulent effusion. *Etiology:* The exudate may be purulent from the beginning, but usually it starts from a seropurulent effusion and gradually acquires a thicker consistency as the pus cells increase. The pneumococcus and streptococcus are the common etiological germs found in the exudate. According to most observers, the pneumococcus is the causative organism in about half of all cases in hospital practice. Lord, in his series of empyemas, found streptococcus in 39.4 per cent, pneumococcus in 20.4 per cent, staphylococcus in 3.6 per cent, and mixed infections in 16 per cent. The pus was sterile in 18 per cent, and many of this group were tuberculous. But during the war period the statistics show a predominance of the streptococcus. The great epidemics of measles, influenza and streptococcus pneumonia were associated with an overwhelming proportion of

streptococcic empyemas. Empyema is generally a complication of some lung inflammation. In military practice, penetrating wounds of the chest contribute a fair share of the cases.

Having outlined and discussed the various etiological factors of pleurisy in the foregoing statements, I wish to lay stress on one or two points which I think will be of interest to all. During my student days in medicine, I remember well the statement that our professor in medicine made, "that an idiopathic pleurisy" was always tubercular in origin, and in after years in practice I had a case which was very interesting, of which I will give a brief outline.

Female, white, age twenty-four, of good social and moral standing, married, complained of anorexia, mental torpor, and a general down and out feeling which had been going on for several weeks, accompanied by a slight feeling of discomfort and occasional pain in right chest. She had always been a strong and healthy girl, had the usual diseases of childhood, no serious illness of any kind, and, since marriage, had given birth to one strong and healthy girl baby.

Upon physical examination I could not make out anything in the chest except a slight pleural rub in right lower chest, which was not accompanied by pain on deep inspiration or expiration. Thinking possibly that there might be some pulmonary involvement, I made several examinations of the chest, but always found it negative. Abdomen was negative at all times, while she was under my care. Urine and blood normal, as well as temperature and pulse. Bearing in mind that there might be a possible focus of infection that I had overlooked, I advised her to go to a T. B. specialist, which she did, and he reported negative findings in her chest. About three months after this illness she was taken suddenly ill with a severe colicky pain in right lower abdomen and elevation of temperature, slight nausea, but no vomiting. She was immediately taken to a hospital, where the regular routine examination was made and the only thing of interest was rigid right rectus, and elevated temperature, blood and urine being normal. The surgeon advised operation under local anesthesia and, upon opening up the abdomen, he found a badly inflamed appendix with a localized peritonitis with quite an exudate which proved to be tubercular.

I simply mention this case to show you that while the main initial symptoms in the chest were pleuritic in character, it developed later on that the appendix was the seat of trouble. After convalescing from the operation, this patient again went to a chest specialist and he reported negative findings, and today she is a strong and robust woman.

Before closing this paper I would like to impress the importance of making a thorough physical examination in all cases which come to you complaining of a pain in the chest. The average physician, I am sorry to say, does not make a thorough examination of all patients, but I am sure, if he should do so, he would find that he would be able to clear up a good many obscure cases and that he would make a better impression on his clientele.

OCULAR INTERPRETATIONS IN THE DIAGNOSIS OF SYSTEMIC DISEASE.*

By HUNTER H. McGUIRE, M. D., Winchester, Va.

First, I desire to express my appreciation for the honor conferred upon me at your last meeting, when you saw fit to elevate me to the presidency of an association which, though young in years, is already assuming a prominent position in developing scientific medicine in this great old Commonwealth. I liked to feel, however, that your action has been the result more of a desire, on the part of this Association, to give public recognition to the specialty I represent, than to honor me personally, and I sincerely hope that such has been the case.

It is with this thought in mind that I feel constrained to point out very briefly some of the great developments in the science of ophthalmology in recent years and to emphasize what these developments have meant to internal medicine. That ophthalmology has more than kept pace with the other branches of medicine is without question, and that it has become to be recognized as one of the most important specialties of medicine can be asserted with equal emphasis.

It is a significant fact that the policies of a great medical organization, the American Medical Association, are, this year, being guided and directed by an able representative of ophthalmic science, Dr. George E. de Schweinitz, of Philadelphia. This one fact, it seems to me, indicates that the medical pro-

*Address of president before the Medical Association of the Valley of Virginia in Winchester, May 31, 1923.

fession of this country has been impressed by the contributions ophthalmologists have made concerning ocular interpretations in the diagnosis and treatment of constitutional disease. It is, therefore, with the view of enlisting your sympathy and interest in this phase of the work that I wish to direct your attention to a few ophthalmoscopic conditions which in themselves point to certain pathologic processes in distant organs, and to make some comments upon visual field changes in the diagnosis of certain diseases of central origin.

The ocular changes in the various forms of nephritis, manifesting themselves in exudative types of retinitis with retinal hemorrhages and occasionally optic neuritis, are always discussed in textbook articles pertaining to this subject, and yet how often are these patients first seen by the ophthalmologist, after a destructive pathologic process in the kidney has practically doomed its victim.

We hear much these days of arteriosclerosis. In fact, it might be said that it has become to be a fashionable disease, and the man who can boast of hardened vessels and a high blood pressure at once assumes an air of distinction, which his less fortunate fellowmen are unable to obtain. In general arteriosclerosis, the retinal vessels of course share and, while it is not possible in all cases to detect any evidence of the disease with the ophthalmoscope, in the great majority it is possible to do so: consequently, arteriosclerosis is one of the diseases often first discovered by the ophthalmologist.

It is a well known fact that the retinal vessels can be examined during life with a minuteness that is not possible with any other vessel of the body, for they are seen with great distinctness and under a magnification of about 15 diameters: thus, changes in their structure are readily detected, and the progress of the changes can be traced. It would be interesting, if time permitted, to describe these changes from the incipient stage of the disease to the stage where we are able to observe almost complete obliteration of the vessel.

The uveal tract, because of a generous blood supply, is a favorite location for evidences of constitutional disease. The great vascularity of this structure with frequent anastomoses of the large sized vessels appears to furnish a particularly fertile soil for the elimination of bacteria or their toxins, and we not infrequently find here manifestations of disease before it

is discovered in other parts of the body. As examples of such instances may be mentioned syphilis, tuberculosis, dental disease and gastro-intestinal disturbances.

The various changes we find in the optic nerve, originating from new growths in the brain or toxins in the blood stream, ranging from a slight hyperemia to choked disc, the slowly progressive optic atrophy of luetic origin, the picture indicative of pituitary body disease, are manifestations which deserve the attention of the internist and neurologist, in the study of their cases, and should not be overlooked in reaching logical conclusions in the diagnosis of disease.

It is not possible even to mention many important ophthalmoscopic changes which should concern the internist in his analysis of an individual case and my sole desire in bringing this subject to your attention is to emphasize the importance of complete ophthalmoscopic investigation in the diagnosis of those diseases in which we know ocular changes occur.

In the present state of our knowledge and in the rapidly developing methods of accuracy in diagnosis, we are frequently overlooking very important symptoms if we fail to study the eye-ground.

The ophthalmoscope should be as universally employed as the stethoscope. I do not mean to intimate that the general medical practitioner, or even the specialist in internal medicine, will be able to interpret eye-ground changes with the same degree of accuracy as the trained ophthalmologist but I do feel that, with the new type of electric ophthalmoscope and a reasonable degree of practice, he will be able to recognize departures from the normal. He certainly should be in a position to determine whether he is dealing with a healthy or diseased fundus and can, if necessary, call to his assistance an eye man for the interpretation of the clinical picture.

The ophthalmoscope of Hemholtz, which has in the process of development attained a greater degree of efficiency in the present electric instrument, has opened up a field of investigation, the value of which cannot be estimated, but ophthalmology is now in a position to assure the medical world that an even greater field of investigation is shortly to be developed. The advent of the slit lamp of Gullstrand, an instrument with which it has become possible to study the microscopical

structure of the living eye and thereby recognize pathological changes in the cellular tissues, promises to revolutionize ocular pathology. While yet in its infancy, both American and European investigators, in their researches, have convinced the ophthalmological world that slit-lamp microscopy is destined to become of far reaching value in the study of pathological conditions of the eye. It would seem, therefore, that this method of investigation should establish an even closer relation between ocular lesions and systemic disease than has been obtained up to this period.

Perimetry, or the study of visual field changes, has undergone rapid developments in recent years and has added much to our knowledge of diseases of the optic tracts. The characteristic changes in simple glaucoma, in the various types of optic atrophy, in retrobulbar optic neuritis, and in diseases of the chiasm and pituitary body, have been of untold value in enabling the ophthalmologist to correctly interpret lesions behind the eye and in aiding the neurologist in the diagnosis of functional nervous diseases.

This brief and very imperfect presentation of a subject which needs more elaboration will, I trust, at least help to stimulate an interest on the part of this Association in establishing a more intimate relationship between ocular pathology and general systemic involvement.

NEGLECTED HYGIENIC MEASURES IN THE TREATMENT OF ACUTE INFECTIOUS DISEASES.*

By S. B. NICKELS, M. D., Clinchport, Va.

In choosing this subject for my paper today, it is not my intention to bore you with something that you already know but its purpose is briefly to call your attention to a few measures—hygienic and therapeutic—which are very frequently neglected by many physicians, especially by those practicing in rural districts who do not have access to a hospital, and to a lesser degree those practicing in large towns and cities.

One of the first commonly neglected measures to which I wish to call your attention is *care of the mouth* in acute infectious diseases, or especially acute illness accompanied by a temperature. To my mind this is one of the most frequently neglected points by the majority of physicians today. The mouth should be

kept scrupulously clean by a cotton swab applicator two or three times daily. Saline solution, sodium bicarbonate, euthymol, borax solution, or a combination of these, with ten or twenty per cent. glycerine or other mild cleansing solution such as Dobell's, may be used. Keeping the mucous membrane of the mouth clean and the teeth properly cared for will shorten many an hour of suffering due to stomatitis, infections, and abscess of the salivary glands which frequently takes place, especially in pneumonia. The patient rests more comfortably, takes nourishment better, and digestion is not altered by the bacteria which would otherwise be swallowed. How can a patient with a heavy coat of sordes on the teeth and ulcerated patches over the mucous membrane of the mouth take nourishment with any degree of comfort? The writer on his first visit to a patient having an acute infectious disease prescribes the following simple mouth wash to be used as directed previously:

Euthymol 3 ounces.

Aqua qs 6 ounces.

Protection of mucous membranes from trauma, etc., with albolene and similar petroleum oils, is of value following cleansing of mouth, especially in mouth breathers and where there is mucous membrane infection. Carious teeth, old roots, tartar deposits, etc., should be seen to. Antiseptics such as phenol, eucalyptus, argyrol, silver nitrate, iodine, etc., are of doubtful value. Their use may cause injuries to mucous membranes. If used they should be in dilution too weak to cause irritation.

Second, *Nasal Infection* and nasal vault infection are frequently neglected as well as accessory sinus disease. These may be sources of danger but are difficult to treat effectually by the general practitioner. Mechanical cleaning by swabs is allowable; syringing is liable to cause injury or spread infection. Patient may clean nose by blowing, if old enough; application of ointment and medicated oils for protection and mild antiseptic action is of value.

Third, *Care of Skin*: The patient should have at least one bath daily and be sponged oftener in case of a high temperature. The patient should be sponged or bathed first with warm water followed by a mixture of equal parts of alcohol and two per cent boric acid in water at the required temperature. The following complications can generally be prevented by an experienced nurse:

*Read at the meeting of the Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

1. Bed sores;
2. Corneal ulceration;
3. Middle ear infection;
4. Parotitis;
5. Boils;
6. Cracked lips;
7. Tender toes;
8. Hypostatic congestion.

(1) To prevent bed sores: (a) Keep sheets clean, dry and smooth. (b) Clean the skin promptly, dry it, rub in zinc oxide ointment and powder with starch or talcum. (c) Do not allow prolonged pressure on bony prominences. If a red spot appears where there has been pressure, keep off that part by rings or pads and paint the spot with picric acid, one per cent.

(2) To prevent corneal ulceration, keep cornea clean by bathing the eyes every four hours with a two per cent watery solution of boric acid.

(3) Boils in crops are generally due to the use of dirty sponges. If a boil appears, care must be taken to avoid spreading of the infection.

(4) Cracked lips can be prevented by the use of cold cream.

(5) Middle ear infection or parotitis, as mentioned before, may result from improper care of the mouth. The mouth may be cleansed as directed before and the throat sprayed every four hours with a non-irritating antiseptic as Dobell's solution, or alkaline antiseptic or an oily spray as chloretone inhalant (P. & D.) will serve, diluted if necessary, to avoid irritation of the mucous membranes. Excessive dryness of the tongue from mouth breathing can be prevented by the use of vaseline or liquid albolene.

(6) Hypostatic congestion of the bases of the lungs is due in part to protracted lying in one position. It can be combated, if not prevented, by rolling the patient on one side and supporting him in position for an hour or more by means of a pillow. The patient should then be rolled on to the other side for another period of time, and these maneuvers should be practiced at least once daily.

Fourth, *Isolation* is of great value and should be as early as possible. Finding of missed cases, such as scarlet fever, etc., in a family or neighborhood or school are often possible by investigation at the time of the first recognized case. Isolation should be carried on for four weeks in case of scarlet fever and until

there are no abnormal discharges according to the discretion of the attending physician. Technique of isolation is that of surgical asepsis reversed, that is, to keep infection in a small zone instead of a small area free from infection. Avoid infecting clothing or utensils from careless touching of patients or putting infected hands or things into pockets, etc. Wash hands carefully on leaving zone of infection. Do not handle face or uninfected objects until hands are thoroughly cleansed. Be careful of door-knobs. Boil dishes, utensils, etc., as they leave patient. Do not put down infected dishes, etc., in an uninfected zone. Use care to prevent discharges from nose, throat and ear, especially in scarlet fever, from being spread about sick room.

The foregoing measures are briefly those most frequently neglected by the general practitioner and, when given proper attention, our patients escape many hours of suffering which would otherwise happen.

COMMUNITY SYPHILIS WITH OBSERVATIONS ON TYPE INFECTION.*

By JOHN J. GIESEN, M. D., Radford, Va.

The prevailing idea is that syphilis, as a health factor, belongs to the larger cities. This is to a certain extent true. However, there can be and there frequently are small communities in which the occurrence of the disease is alarmingly frequent. This is probably the result of conditions peculiar to the particular community. One syphilitic in a village or town can quickly infect, directly or indirectly, a large percentage of the population. Various factors and conditions may aid or retard infection, where there happens to be a focus or foci.

During the last four years, I have had the opportunity of treating and seeing in consultation about 100 cases of syphilis in all of its stages, the majority of the cases originating in small towns in West Virginia, Tennessee and southwestern Virginia. All of these cases have been carefully studied and the source of infection determined when possible. In a resume of this series of cases, I have noted a striking fact that fourteen out of the 100 cases came from two small communities, both of which have populations less than 400. Another fact of interest is that the conditions and factors which would ordinarily tend to retard

*Read at the meeting of the Southwestern Virginia Medical Society at Abingdon, September 6-7, 1923.

or favor spread of the disease were markedly different in these two communities. Still another fact of interest is that in the cases from one of the communities we found one type of syphilis predominating, while another type predominated in the cases from the other community.

The names of these two little towns, for obvious reasons, will not be mentioned. One of them is a coal-mining community in southwestern Virginia; the other is a rural community in east Tennessee. The Virginia community furnished eight cases and the Tennessee community six cases to the series. From what we have been able to learn by inquiry and investigation, the morals and standards of living in the Virginia coal-mining community are of low order, while those in the Tennessee rural village are of the highest type. All of the patients from the Virginia community were illiterates or near-illiterates, those from the Tennessee community were all well educated and of a high order of intelligence. However, the majority of the cases from both communities were unaware of the fact that they had syphilis and sought medical advice for relief from some other condition or from some symptom of the unrecognized syphilis. In the Virginia community, where the morals are poor, where marriage is not a stable institution, and where illegitimacy is prominent, we can readily understand how one infected person could, directly or indirectly, infect a large percentage of the population. In the Tennessee community, where conditions are just the reverse, it is not so readily understood, particularly when it is noted that none of our six cases from this community are in any way related, either by blood or marriage. In the Virginia community, the disease seemed to be more of a family affair, all of the eight cases being closely related, either by blood or marriage.

All of the eight cases from the Virginia community exhibited lesions of the skin and bone, one presenting also a cardio-vascular complication, while none were of the neurological type. The Tennessee community's six cases were all of the so-called neurological or "nervous" type: one was a psycho-neurotic with syphilitic background, one had syphilitic epilepsy (congenital), two had general paresis, one had tabes dorsalis, and one had a brain gumma. All of the Virginia cases responded well to therapy and all except two, who did

not complete treatment, made apparently entire recovery. None died. Three of the Tennessee cases subsequently died, the two paretics and one with gumma of the brain, the other three responded poorly to therapy and none made complete recoveries or even satisfactory improvement.

None of the fourteen cases from the two communities were in the acute stage of the disease when seen. All of them had had their trouble for several years or longer. Ten of the cases were previously undiagnosed, although all of them had consulted physicians from time to time for various ailments. None of them had received any anti-luetic treatment prior to coming under our care.

These facts have been enumerated to demonstrate that syphilis can and does infest small communities, even where local morals and standards of living are good, and that the small town or rural physician lets too many of these cases slip through his fingers undiagnosed. By checking up suspicious lesions or symptoms and keeping his eyes open, he can often recognize these cases early instead of allowing them to progress undiagnosed to a stage where therapy is not curative. By an early diagnosis and the prompt institution of treatment, the patient's chances for cure are greatly increased and at the same time the chances for spread of the disease in the community are correspondingly decreased.

It can reasonably be presumed and probably actually demonstrated that all of the six cases of so-called "nervous" syphilis, originating in the Tennessee rural community, developed from some one focus, and that the eight cases from the Virginia coal mining community with predominating skin and bone lesions also developed from some one original focus. All of the fourteen cases, of course presuming our diagnoses to have been 100 per cent correct, were due to the specific organism—the *treponema pallidum*. In the one instance, however, the organism seems to have had a selective affinity for the skin and bone with entire freedom from cerebral or spinal manifestations, while in the other instance the organism seems to have affected principally the nervous system. This is an illustration of the accepted theory that in syphilis there are true type infections or different strains of the organism at fault.

St. Albans Sanatorium.

NON-PULMONARY FORMS OF TUBERCULOSIS AND TUBERCULOUS COMPLICATIONS.*

Their Symptoms and Treatment.

By H. R. EDWARDS, M. D., Richmond, Va.

Under this heading we may discuss the more frequent non-pulmonary forms of tuberculosis, also some of the more common complications usually associated with pulmonary tuberculosis.

In general we may say that the symptomatology of all forms of tuberculosis is more or less similar, especially in the toxemic symptoms manifest, that is, fever in the afternoon, loss of appetite and weight, fatigue, etc., with more or less specific symptoms relative to the particular organ involved, as loss of voice in laryngeal tuberculosis and hematuria in the renal form. For convenience of discussion we will mention the various groups; lymphatic, serous membranes, and special organs.

Tuberculosis of the lymphatics is most often observed in early childhood. Though it is present to some extent in the glandular structure of the majority of adults, as a rule the infection is traceable to early childhood. In the majority of cases it is only slight in extent. The glands usually affected are the cervical, tracheo-bronchial, and mesenteric, the last receiving their infection both from the human and bovine bacilli. Tissue destruction may progress to suppuration with the usual scrofulous conditions, which may or may not heal, but are amenable to the usual methods of treatment. The cervical glands show the largest amount of suppuration.

The symptoms are those of toxæmia, loss of weight, fever, and the phenomena associated with the enlargement of the glands. There is often pain over them and along their course; a child cannot seem to gain weight; he is backward in his classes and listless. The treatment consists of rest, correction of sleeping and living habits and proper diet. The violet ray has perhaps its greatness usefulness in tuberculosis in this particular field; exposure to sunlight in graduated dosage is very effectual. Surgery is a method of last resort and should be abandoned if possible. Tracheo-bronchial and mesenteric forms are given the usual systemic treatment.

The serous membranes most often affected

are the pleura and peritoneum. The pericardium is occasionally affected, but that is not common. There is a latent form with symptoms of cardiac insufficiency, an acute form with the usual general symptoms, quite often a miliary form associated occasionally with cerebro-spinal manifestations. There may still be an exudative form with associated tuberculous and pericardial symptoms.

The pleural form is perhaps the most common form of tuberculosis of the serous membranes. It has been found that nearly all pleurisies with effusion are of tuberculous origin and occur before, with, or following disease of the parenchyma of the lung. The pleural form may be insidious or acute in onset. Usually there are adhesions formed. It may be hemorrhagic in type or there may be serous effusion or purulent effusion resulting in empyematous conditions. Often it is a terminal condition.

Included are the usual symptoms of acute or insidious tuberculosis, and nearly always a variable amount of acute pain noticed most on deep respiration. There is cough which is often very distressing and painful. It tends to chronicity, and is often re-activated by a cold or other acute respiratory infection. In the wet forms aspiration of a small amount of fluid will often reveal bacilli on microscopical examination.

In dry pleurisy we notice an acute onset, usually with chills, fever, dyspnoea, and pains in the side of the chest. There is diminution of motility; percussion is often negative; auscultation, especially in the axillary region, will elicit a "pleural rub," the pain is sharp and lancinating, and there is invariably a non-productive cough. The pain is felt only superficially but often there are distinct tender points. In diaphragmatic forms there are no auscultatory signs as a rule, but the pain, due to the nerve connections, is referred to the neck and the crest of the shoulder. If the infection is along the border of the diaphragmatic pleura, the pain is found in the lower thorax and the upper abdomen. Much depends upon the associated history of onset.

"Interlobar pleurisies" are not usually diagnosed by a friction rub, but there is a definite lessening of breath sounds in the region of the area of involvement, and there seems to be an immobilization of the lung above their point.

"Apical pleurisies" are far more common

*One of a series of lectures and demonstrations to a class of physicians in tuberculosis, held under auspices of the Health Bureau, Department of Public Welfare, Richmond, Va., February 15 to April 15, 1923.

than we have considered them previous to the use of the X-ray; almost always affected in lesions involving the upper lobes. The symptoms are the same as those of dry pleurisy, viz: mild fever, unproductive cough, pain, and loss of weight. On physical examination we find a friction rub, diminished breathing, cog-wheel breathing, and crepitations. Apical pleurisies are practically always associated with a parenchymatous involvement.

Pleurisy with effusion may be insidious, or acute, the symptoms are more or less those found in other forms with the exception of more dyspnoea, depending upon the amount of effusion. Physical examination shows enlargement of the affected side to bulging of the intercostal spaces, rigidity of the erector spinae muscles. There is a flat note on percussion, with a tympanitic note above the fluid line. The presence of adhesions may prevent the flat note appearing anteriorly and, if in sufficient amount, there is displacement of the viscera. Unless prevented by adhesions, the mediastinal contents will be displaced before the lung will become compressed. The course of pleurisies with effusion, if non-tuberculous, is of short duration, reabsorption being the rule. If tuberculous, they tend to chronicity. Tapping is of questionable value, for as Fishberg says: "While the effusion is in the diseased chest, the diseased lung, the tuberculous lesion is compressed; toxemia is thus prevented as in artificial pneumothorax." Often the effusion will absorb, but may go on for months or years. The patient improves rapidly upon absorption. The prognosis is more favorable in children than adults.

The treatment of pleurisies consists of rest in bed as long as there is an elevated temperature, avoidance of exposure, etc. Pleurisy jackets or adhesive strapping often helps. Belladonna plasters, painting with iodine, or some such local counter-irritant is efficacious. In the very acute forms morphia may be required to control the pain. The wet forms are subject to the same course of treatment. Aspiration should not be practiced, if possible to get relief otherwise. Autoserotherapy has been advocated, but is of doubtful value.

Tuberculosis of the peritoneum occurs more often than we have expected before, and is most commonly associated with disease in the intestines. It may be acute and miliary in form or chronic with fibrotic changes, and in some instances hemorrhagic or exudative.

Many times it pursues its course without pain or particular symptoms. It is a fact that many abdomens are opened for exploration or specific surgery and the presence of tuberculous peritonitis found. On the exposure to air and again closing up the peritoneum the condition seems to clear up entirely. Numerous cases have given all the typical findings of an acute appendicitis, when on operation the appendix was found absolutely normal.

The symptomatology consists of abdominal pain, vomiting, diarrhoea, mild fever, loss of weight. There may be ascites and, if in sufficient amount, percussion may give its signs. Adhesions may account for apparent tumor masses. The treatment is that of general tuberculosis; pneumo-peritoneum may have some value, but surgical procedures are best let alone.

COMPLICATIONS OF TUBERCULOSIS

It is a more or less well established fact at the present time that tuberculosis is present in the parenchyma of the lung before it is evident in other organs, as the meninges, kidney, and larynx, any one of which may at any time take the ascendancy. Though it is possible for it to be primary in other locations than the lung, it is usually, however, a complicating factor.

Lobar pneumonia and so-called tuberculous pneumonias often complicate phthisis. The symptoms are those of an acute pneumonia which does not clear up as rapidly as an uncomplicated one is expected to. Occasionally they are terminal.

Considering the alimentary tract, our attention is chiefly concerned with the intestines. Tuberculosis of the tonsils has been noted. It is rare, however, notwithstanding the fact that in most diseased tonsils removed, we find tubercle bacilli present.

Intestinal tuberculosis is most frequent in children. Infection probably takes place by the swallowing of sputum or through extension from the glandular or lung condition. In some it is traceable to the bovine variety of infection. It may be acute or insidious in form. The lesions are located chiefly in the ileum, caecum, or colon, and are characterized by ulceration, which may be slight or extensive. This may proceed to perforation, or heal with a variable amount of stenosis. Its symptoms are: emaciation, rise in temperature, persistent diarrhoea, which is amenable to active treatment but on discontinuing immediately reappears; it may be intermittent but persists over long periods. The stools are variable in

number, often as high as twenty a day, they are fetid, dark colored, at times containing sloughing from the bowel. There may be streaks of blood, but copious hemorrhage is not the rule. The emaciation proceeds rapidly with the diarrhoea. The X-ray in efficient hands often will reveal the ulcerations as filling defects and is a valuable adjunct to our diagnostic methods.

Treatment is doubtful; for most cases appear for treatment only after the disease has been allowed to progress to an advanced stage. Medical treatment consists of rest in bed, a very nutritious diet, easily digestible with little roughage that may irritate the mucosa. Intestinal antiseptics are of doubtful value, though combined with sedatives they are capable of relieving many of the disagreeable symptoms. In a certain type of case, resection of the bowel has been used with good results. The best results in this form as in all others are gained by early diagnosis and treatment. The violet ray has been of distinct advantage in many cases and real cures have been effected.

There is tenderness over the abdomen, colicky pains, and general gastro-intestinal upset, the diarrhoea may alternate with constipation. Occasionally there are tumor-like masses palpable in the abdomen, and always associated with the above symptoms are the other symptoms of pulmonary tuberculosis. There is nearly always a more or less extensive pulmonary involvement which is often active.

Tuberculosis of the brain and cord is most common in the young and as a terminal complication. The brain itself is not frequently affected, the most common point being the meninges. It may be insidious over several weeks' time, or may be acute and take on a miliary type. Occasionally in the chronic form a meningo-encephalitis results with a hydro-cephalic onset. In those cases not in extremis, meningeal involvement should be considered when headaches—an uncommon tuberculous symptom—and vomiting of solids and liquids with nervousness and irritability are present. Various phenomena particularly referable to the brain and cord are noted in the course of the disease as; aphasia, photophobia, drowsiness, and even hemiplegia. Breathing is slowed and may become Cheyne-Stokes in type; the patient finally becomes involuntary and passes into coma and convulsions. In the very early stages of involvement the first symptoms may be the patient's

loss of hopefulness. He takes no more interest in things about him and loses his usual optimism. Lumbar puncture may reveal a cloudy fluid, with an increased lymphocytosis and a high pressure. Repeated tapping relieves some of the symptoms but it is usually a terminal affair, the patient lasting only a few days to a few weeks.

Tuberculosis of the genito-urinary tract occurs rather infrequently, in females usually, between the ages of twenty to thirty years. It spreads by the blood stream, peritoneum, direct extension, coitus, and instrumentation. It may involve the parenchyma of the kidney only or extend to the ureter, bladder, or any of the connected organs, as the seminal vesicles, vas deferens, and epididymis.

The symptoms in the early stages are difficult to diagnose. The urinary findings most constant are pus cells, epithelium, albumin, and an acid reaction. The presence of tubercle bacilli may not be demonstrable on concentration of a catheterized specimen under the microscope, but injection into the guinea pig may prove a diagnosis. Hematuria is not a constant finding but occurs fairly often. There is impaired function of the affected kidney as demonstrated by the phenolsulphonphthalein test.

The usual symptoms are dull pains in the lumbar region, irregular fever, chills, loss of weight and appetite, the kidney may even be palpable. In the advanced stages we often have the conditions present in an advanced nephritis as oedema, anasarca, or even uraemia.

The treatment of this form of tuberculosis consists largely of the treatment in other forms in the earlier stages. A bland diet requiring the minimum of elimination on the part of the kidneys is essential; absolute rest in bed while there is an elevated temperature is important. Violet ray has been used. In the more advanced forms of renal tuberculosis surgical interference is often resorted to. It is stubborn at best and the sooner a diagnosis is made the better, for it is the earlier treatment that is most efficacious.

Laryngeal tuberculosis may be primary but is usually preceded by pulmonary disease. It occurs in from ten to fifty per cent of cases but is a serious factor in only a small number of cases. Males are the most often affected. Their occupational surroundings, abuse of tobacco and alcohol, likely being accountable for it. It consists in an infiltration of the vocal chords

with ulceration and sloughing. The aryepiglottidean folds and interarytenoid space is often involved.

The symptoms are often varied as to the location; those showing a lesion at the entrance to the larynx are more severe than those showing one inside the larynx. Hoarseness is present in varying degrees, from mild tiring of the voice to complete aphonia. There is a variable amount of pain which may be paroxysmal and severe. Dysphagia exists in variable degrees. Warm foods and solids are the hardest to pass. Loss of weight, elevated temperature, and the usual symptoms are present. Though some cases show no loss of weight, its course either acute or chronic, if it goes into ulceration and fibrous aphonia, may be permanent.

Treatment consists first in putting the larynx at rest: in the mild cases whispering may be allowed, but, if the oedema is marked and the hoarseness persistent, much better results are obtained with complete cessation of speech and the observance of the usual regimen for tuberculosis. The local treatment consists in cauterization and application of escharotics both of which are doubtful in value and only advisable in experienced hands. Lactic acid in solutions of fifty per cent strength is used by some but its use also is questionable. Solutions of twenty to twenty-five per cent argyrol are sometimes soothing and, in my experience, I have felt they have a psychic effect on the patient; their healing value is doubtful. Sprays of orthoform combined with menthol and chloroform often help, as do solutions of cocaine. Alcoholic injection into the superior laryngeal nerve in cases of severe dysphagia has been practised.

Appendicitis is a possible complication though the men doing the largest amount of tuberculosis work have had no particular success with surgical intervention; it usually occurs in the terminal stages and operation would not mean much to the patient. It is a fact that many appendices removed show the presence of tubercle bacilli. Its diagnosis is often difficult as there are numerous conditions simulating it.

Phlebitis and thrombosis occur usually in the terminal stages and usually in the femoral vein, though they are known in the jugular. The diagnosis is easy as the edema starts in one extremity and the usual signs of phlebitis are present. Purpura is observed most often

in the terminal stages; superficial cold abscesses are rare.

Empyema occurs usually following a pneumonia and, if it is not infected with the tubercle bacilli, the prognosis is much better, but in the presence of the bacilli its eradication is long and tedious. Much has been done in recent years with rib resection to get dependent drainage and irrigation with Dakin's solution and weak solutions of iodine. In those cases supposed to be of a tuberculous nature, Beck's paste has been used to advantage, but it is a slow process. In the absence of adhesions much can be expected of the final re-expansion of the lung. Adhesions almost always complicate, and various methods have been advised for their destruction. Radical operations are to be avoided if possible. Permanent fistulas are the rule.

Spontaneous pneumothorax occurs in the healthy as well as in the tuberculous; however, the consensus of opinion is that the phenomenon is due to a tuberculous lesion of the pleura which ruptures, causing a rent in the pleura. It occurs most often in males. Sometimes there is no apparent exciting cause; in other cases, overexertion, coughing, and the like precipitate it; in some cases it is terminal. It may be complete or partial in the case of adhesions. Tuberculous disease of the lung is either present at the time or very often follows the spontaneous collapse. Cases have been known to go for years with a collapsed lung without serious symptoms at its onset or during its course.

The symptoms are acute distressing dyspnoea, cyanosis, rapid and very feeble pulse, coldness, perspiration; the expression is that of agony, prominent eyes and cyanotic lips, lowered temperature. Some cases terminate with this condition in profound shock, others gradually recover. There may be effusion of fluid in the pleural cavity. Physical signs show an immobilized side, percussion gives a hyperresonant note, shifting dulness is evidence of air and fluid in the pleural cavity. Metallic and amphoric notes are elicited, breath sounds are absent. The diagnosis is often difficult, depending usually upon the degree of collapse but, in the course of pulmonary tuberculosis, the sudden onset of dyspnoea, pain in the chest, and physical signs of pulmonary collapse, the diagnosis is comparatively easy. The tympanitic note depends upon the tension

of the air in the cavity, thus low tension may not give a tympanitic note at all.

In treating this condition, if it is mild, usually all that is needed is a hyperdermic injection of morphia, keep the patient quiet for several days and gradually allow him to go back to light exercise. In the very acute forms the treatment is urgent, a heart stimulant is necessary, and the usual procedures for shock. Thoracentesis is next to be performed; this may be repeated at intervals through the day when it becomes necessary. A cannula may be inserted and rubber tubing connected and immersed in water to form a water valve arrangement to prevent the return of air into the lung. In some cases even an increased pressure in the pleura may facilitate the healing process.

If the cases are not in danger, it may be advisable to allow the compression to remain and to institute artificial pneumothorax.

Influenza is a complication and some authors claim that they have seen few cases with symptoms of re-activation that were not due to the tuberculous process directly rather than to influenza. In the past epidemic there were without doubt many cases of influenza in tuberculous cases, but it is also true that without a doubt many of the deaths attributed to influenza were likely due to tuberculosis.

1110 Capitol Street.

THE PHYSICIAN'S SYMPATHY IS A PSYCHOLOGICAL REMEDY OF GREAT VALUE IN THE TREATMENT OF DISEASE.

By WILLIAM JOSEPH JONES, M. D., Crozet, Va.

In order to elucidate my subject, I shall briefly refer to two nerve trunks which originate in the brain, and are located one on either side of the spinal column. These two are one nerve, called the great sympathetic nerve. Within the sheath of this nerve are situated numerous enlargements which are named ganglia. These are composed of gray matter and are centers of nervous influences. The great sympathetic sends branches or filaments each to its fellow, above and below, to the spinal cord, which is an extension of the brain, and by plexal connections establishes communication with all the organs of the body. It is the greatest factor in motion as well as sensation, and without its mysterious influence there would be no harmony in the varied functions of organic life. When one organ is dis-

eased or injured, the whole physical economy is in sympathy. In the healthful processes of the body there is sympathy everywhere, without which thinking, tasting, smelling, hearing, seeing, feeling, digestion, assimilation, and elimination could not go on in harmonious accord without disturbing elements. It might be that a traumatic or pathologic condition would cut off sympathy from the brain and produce a psychological disturbance causing hypochondria, dementia, or insanity. It might be that the fibers of the sympathetic which supply the heart would be injured or diseased so that accumulating toxins would clog the wheels of life, when abnormal circulation of the blood current with indescribable distress and fearful apprehensions would lead on slowly but surely to the cold, dark chambers where sleep the countless dead. All physical functions must have sympathy in order to perform without pain or friction the work that nature has assigned.

If the great sympathetic nerve, which contributes an influence as unknown and mysterious as spirit with spirit, becomes diseased or in any way disturbed, one can readily understand that there will be confusion in every organ and through organic disturbances inharmonious conditions would affect bone, sinew, and muscle.

These physical facts convey to our minds some sort of conception of the relations of human beings to one another. The physician in his special relation is pre-eminently one who must take into consideration not simply physical conditions but also mental and spiritual entities as matters of profound study, embracing the domains of psychology and religion in order to treat intelligently the varied aspects of personalities that will come under his observation; without such knowledge he would often find perplexities to obscure his intelligence and hinder his medical skill. The physician must be all things to all of his clientele. Of necessity he enters largely into the peculiar conditions and, indeed, the secrets of every family who claim him as physician and on whom they rely for psychological as well as physical healing. The soul of a man or a woman is often in greater need of treatment than the body and frequently the bodily ailment must be treated, if treated at all, through the mental and moral susceptibilities of the patient. The man who writes M. D. after

his name may have won the right to do so by hard mental work and may truly deserve the diploma which hangs on the wall of his office, yet he may be a professional failure at the bedside of the sick because he aims to practice only the science and art of medicine and does not put genuine humanity into his conduct.

There has been only one *Great Physician* since the world was inhabited. He combined the moral and physical. He touched the heart whenever he healed the pathological flesh. Hippocrates reached upward and forward when he founded in scientific truth and moral equity our great profession, which, since his time, has progressed to the wonderful skill and amazing success of this day and generation.

It may be that the large majority of medical men are not ready to acknowledge allegiance to the supremacy of spirituality or to psychological evolution rather than the product of a plasma passing through a tadpole existence to a state of apeism, through a missing link to that mysterious humanity which none of us comprehends. Nevertheless, there are some who forsake the comforts of christian civilization and bend every act of life in a sympathetic devotion to the uplift of humanity in the far-away territory of foreign superstition and ignorance. The scalpel and the hypodermic are means that often lead to the fountain of life from which flows the civilization of the Great Teacher and the truth that spans the ages of eternity. Our profession has reached not only high standards in skill and science but has also won an enviable place among the great and good who have devoted sacrificial labor with intensity of thought in investigation and experimentation along the lines of sympathy for suffering human beings, searching in the field of psychology as well as in the territory of science.

About forty years ago, I had a hurried morning call to visit a baby six or eight months old, said to be dangerously ill. It was the first child of one who had arrived at the mile post a few years after young maidenhood, when she married a widower of age and experience. On my arrival she met me at the door with the baby in her arms. Her first words were "Doctor, I fear that you cannot properly examine my baby." It was screaming and writhing as if in great pain. I said "I think I can. You sit down and calm your-

self." She said that the baby would not leave her a minute and that it had suffered since midnight. I talked quietly and sympathetically to the mother. The baby watched me and listened. In ten minutes it had ceased screaming and writhing and, after permitting it to inspect me until I thought it was satisfied, I held out my hands. It came to me and nestled in my arms, the arms of a loving father. It was soon asleep and I delivered it to its mother. I held out my hand to say good-bye. The other words were, "Your baby is not sick and therefore does not require medicine. It is now well. Do not forget what you have learned."

A young lady, past her teens, was suffering intensely. Her parents were considerate and did not call me until after the breakfast hour. I was ushered into her room and saw at once that this was a case of hysteria. I sat on a chair placed by her bedside for me. I did not ask to see her tongue, nor did I place my fingers on her wrist where the pulse was beating away her young but unhappy life. I preferred to talk to her and with her. I spent an hour or less with her. When I bade her goodbye, she thanked me for my visit, and said, "Doctor, I feel much better now. I am free from pain and think I can sleep. Come to see me again." I did go occasionally and had the pleasure of seeing her a useful and happy personality in her home and community.

Let us be careful to hold to the good things of the past. Sympathy helps the giver and the receiver and elucidates both the predicate and the subject.

It is good, by the use of your hypodermic, to relieve the intense pain of a boy who induced a colic by eating a cabbage stalk or a raw turnip. That case demands action rather than sympathy. In the practice of medicine there is as much use for sympathy as for the hypodermic syringe or the judicious application of mustard and hot water. Psychology has a place as important as drugs and instruments. Even the ignorant and wicked sometimes learn a lesson of wisdom and reform the conduct of life to conform to the standards of propriety and righteousness, and the good and skillful physician has credit in records of eternal justice. The highest ideals of physicians are not found in material values, but in psychological entities.

Correspondence.

Let's Get Together on the Roads.

The Plains, Va.,
November 9, 1923.

TO THE EDITOR:

Now that the Pay-as-you-go Plan has been adopted by a decisive majority of the voters, it behooves every one of us who loves Old Virginia to "bury the hatchet" and put his or her shoulder to the wheel and do our best to make a success of the adopted plan. *For it is the roads after all that we want*, much more than the success or failure of any particular plan.

And above all, let's discard at once the argument, all too frequently heard in the recent campaign, that "the good roads would not benefit anybody but tourists and joy riders."

In the first place, this is not an argument for the Pay-as-you-go Plan, or for any other plan of building roads; on the contrary it is an argument directly against building roads by any plan. In the second place, it isn't true and, as long as any considerable percentage of Virginians maintain this attitude toward roads, just so long will Virginia have to remain in the mud.

A recent copy of the *Southern Planter* contained a letter from a farmer in Louisa County, in which he complained that down there, there was a road being built that paralleled the C. & O. R. R. for most of its length. Then he asks the question, "How can a road that parallels a railroad possibly help the farmers?" and answers his own question by saying, "If we farmers need good roads at all, we need only a few miles on which to haul our produce to the railroad for shipment and not great stretches of road for tourists to joy-ride over."

Now if this gentleman would go up into Maryland or Pennsylvania and drive over some of the great highways leading west from Baltimore or Philadelphia to the far western borders of those States, the first thing with which he would probably be struck would be the large number of enormous trucks going into Baltimore or Philadelphia, some of them probably from 100 to 150 miles away, loaded down with corn and wheat, hogs, sheep and cattle, some with as many as five fat cattle aboard; in fact, transporting everything the farmer produces or consumes into or out of the Balti-

more and Philadelphia markets. Then he would realize at once that these farmers are not "joy-riding" their hogs and cattle to market but are transporting them this way, over roads paralleling the railroads mind you, because it is cheaper transportation than the railroad has been giving them.

What are the railroads going to do about this? Are they going to let their engines and rolling-stock lie idly on the siding and watch this business go by them? Not a bit of it! They are going to reduce their freight rates and get their share of the business, and *the farmer gets the benefit of the reduction*. Nor will the railroads be injured by it any more than have the Express Companies been injured by the Parcel Post. Honest competition injures nobody.

This is but one illustration of the many ways that the improved highways are benefiting the farmers in the states that have them.

Another argument too frequently heard is that "having always gotten along without the improved roads, we can continue to get along without them." So we can, but any of us who might be unfortunate enough to have a member of his family very ill, or to be suffering with a severe pain himself, and the doctor had to come horseback over miles of mud roads, or perhaps spend several hours prying his automobile out of a mud-hole with fence rails—I say, any one in this position would probably think that it was indeed a slow way to get along.

And so I might go on almost indefinitely multiplying arguments to illustrate how improved roads benefit not only the farmer, but the merchant, the doctor, "the butcher, the baker and the candlestick-maker," in short, every business man and woman, whoever or of whatever profession they may be. Yes, we need the through highways as well as the short by-ways and we need them for business transportation much more than for pleasure and comfort.

Furthermore, unless and until Virginia gets her farmers connected up with her markets by improved roads, her farmers will have to compete at a disadvantage with those of our neighboring states where they are already connected up.

And though many of us thought the Bond Issue Plan better than the Pay-as-you-go Plan, now that the latter has been adopted,

let's get together on it, stop talking so much, and go to work with all our might to get the roads built as rapidly as possible.

RICHARD MASON, M. D.

The Truth About Medicine

In addition to the articles enumerated in our letter of September 29th, the following have been accepted:

- Cheplin's Biological Laboratories
- Cheplin's B. Acidophilus Milk
- Lederle Antitoxin Laboratories
- Diphtheria Toxin Antitoxin Mixture (0.1 L+)—Lederle, 30 c.c. vials
- H. K. Mulford Company
- Diphtheria Antitoxin Standard—Mulford
- Diphtheria Antitoxin Superconcentrated—Mulford
- Parke, Davis & Company
- Antidysenteric Serum—P. D. & Co.
- Protein Extracts Diagnostic—P. D. & Co.
- Colon Bacillus Protein Extract Diagnostic—P. D. & Co.
- Gonococcus Protein Extract Diagnostic—P. D. & Co.; Micrococcus Catarrhalis Protein Extract Diagnostic—P. D. & Co.; Pneumococcus, Type I, Protein Extract Diagnostic—P. D. & Co.; Pneumococcus, Type II, Protein Extract Diagnostic—P. D. & Co.; Pneumococcus, Type III, Protein Extract Diagnostic—P. D. & Co.; Pseudodiphtheria Bacillus Protein Extract Diagnostic—P. D. & Co.; Staphylococcus Albus Protein Extract Diagnostic—P. D. & Co.; Staphylococcus Aureus Protein Extract Diagnostic—P. D. & Co.; Staphylococcus Citreus Protein Extract Diagnostic—P. D. & Co.; Typhoid Bacillus Protein Extract Diagnostic—P. D. & Co.
- Silver Nitrate in Capsules—P. D. & Co.

NEW AND NONOFFICIAL REMEDIES.

New Tuberculin B. E. Dried.—To obtain this product, tubercle bacilli are dried, ground for several months in a ball mill, the finely disintegrated bacillary bodies are mixed with a suitable base and made into tablets. Each tablet represents a definite amount of New Tuberculin B. E. Dried.

Tablets Tuberculin B. E.—P. D. & Co.—New Tuberculin B. E. Dried, marketed in vials No. 1 of ten tablets, each tablet containing 0.0001 mg.; in vials No. 2 of ten tablets, each tablet containing 0.001 mg.; in vials No. 3 of ten tablets, each tablet containing 0.01 mg.; in vials No. 4 of ten tablets, each tablet containing 0.1 mg.; in vials No. 5 of ten tablets, each tablet containing 1 mg.; also marketed in packages of 5 vials, Nos. 1, 2, 3, 4 and 5 inclusive. Parke, Davis & Co., Detroit.

New Tuberculin T. R. Dried.—The mass culture of tubercle bacteria is washed repeatedly, agitated again in water, washed, ground to complete disintegration, extracted repeatedly with water, and the water insoluble material, instead of being ground to form a suspension in water as in New Tuberculin T. R. Liquid, is dried. The dried material is thoroughly mixed with a suitable diluent. Each tablet represents a definite amount of dried tubercle bacilli.

Tablets Tuberculin T. R.—P. D. & Co.—New Tuberculin T. R. Dried, marketed in vials No. 1 of ten tablets, each tablet containing 0.0001 mg.; in vials No. 2 of ten tablets, each tablet containing 0.001

mg.; in vials No. 3 of ten tablets, each tablet containing 0.01 mg.; in vials No. 4 of ten tablets, each containing 0.1 mg.; in vials No. 5 of ten tablets, each tablet containing 1 mg.; also marketed in packages of five vials, Nos. 1, 2, 3, 4 and 5, inclusive. Parke, Davis & Co., Detroit. (Jour. A. M. A., Oct. 6, 1923, p. 1207).

Sal-Ethyl.—A brand of ethyl salicylate—N. N. R. For a discussion of the actions, uses and dosage of ethyl salicylate, see New and Nonofficial Remedies, 1923, p. 272. Sal-Ethyl is supplied in the form of Sal-Ethyl Capsules, 5 minims. Parke, Davis & Co., Detroit. (Jour. A. M. A., Oct. 13, 1923, p. 1285).

Antidysenteric Serum—P. D. & Co.—An antidysenteric serum (see New and Nonofficial Remedies, 1923, p. 287), obtained from horses immunized against several strains of Shiga and Flexner Types of dysentery bacilli. It is marketed in packages of one syringe containing 10 c.c.; in packages of one vial containing 10 c.c.; in packages of one vial containing 20 c.c. Parke, Davis & Co., Detroit. (Jour. A. M. A., Oct. 20, 1923, p. 1363).

Cheplin's B. Acidophilus Milk.—A milk culture of bacillus acidophilus, containing not less than fifty million of viable B. acidophilus per c.c. at the time of sale. For a discussion of the actions and uses of bacillus acidophilus milk, see Lactic Acid-Producing Organisms and Preparations (Jour. A. M. A., Sept. 8, 1923, p. 831). For adults the dose is from 500 c.c. to 1,000 c.c. Cheplin's B. Acidophilus Milk is marketed in bottles containing respectively 200 c.c. and 400 c.c. Cheplin Biological Laboratories, Inc., Syracuse, N. Y.

Diphtheria Antitoxin Standard (Purified and Concentrated Globulin).—Formerly marketed as diphtheria antitoxin concentrated (globulin). (See New and Nonofficial Remedies, 1923, p. 283). This brand of diphtheria antitoxin concentrated is also marketed in packages of one syringe containing 20,000 units. H. K. Mulford Company, Philadelphia.

Diphtheria Antitoxin Superconcentrated.—The product resembles serum antidiphthericum purificatum U. S. P. It differs in that the volume per thousand units is smaller, and the protein content is claimed to be lower. It is marketed in packages of one syringe containing respectively 1,000 units, 3,000 units, 5,000 units, 10,000 units and 20,000 units. H. K. Mulford Co., Philadelphia.

PROPAGANDA FOR REFORM.

Colorless Iodin Preparations.—The so-called colorless iodine preparations do not contain iodine in the free state, but some form of combined iodine, chiefly iodid. For instance, Tinctura Iodi Decolorata, N. F., is a solution of sodium iodid and ammonium iodid obtained by mixing iodine and sodium thiosulphate, stronger ammonia water and alcohol. When tincture of iodine is used externally, it is with the view of obtaining the therapeutic action of free iodine. Since the colorless iodine preparations do not contain free iodine, their external use as a substitute for tincture of iodine is irrational. When tincture of iodine is given internally, the free iodine contained in it is converted into iodid before absorption. Therefore, tincture of iodine and the so-called colorless iodine preparations given internally have essentially the same therapeutic effect. However, if a colorless iodine preparation is to be administered, it would be simpler and more rational to administer sodium iodid. (Jour. A. M. A., Oct. 20, 1923, p. 1383).

The Action of Arsenicals in the Body.—Voegtlin and his associates, in the Hygienic Laboratory of the U. S. Public Health Service, have observed that certain compounds containing sulphur groups in the SH form are able to counteract the toxic effects

produced by arsenoxid on trypanosomes and a representative mammal. They advance the theory that arsenic in certain trivalent forms is a specific poison for the SH group in the trypanosome organism, and that arsenic causes death of the cells by interfering with the oxidative processes. Voegtlin and his associates concluded that the failures reported in the treatment of the later stages of syphilis are due to the fact that arsphenamin, neoarsphenamin and silver arsphenamin lack the essential penetrative power for the infected tissues, and for this reason, they do not reach the last parasites in sufficient amounts to cause their death. In the effort to secure a more complete sterilization of syphilitic patients in the more advanced stages of the disease, sulpharsphenamin, tryparsamid and 3-amino-4 oxyphenol arsonic acid are suggested for trial as remedies of superior penetrative power. (Jour. A. M. A. Oct. 27, 1923, p. 1442).

Van Ess.—The Van Ess Laboratories, Inc., Chicago, put out "Van Ess Special Dandruff Massage" and "Van Ess Liquid Scalp Massage." "Van Ess" is sold with the claims that it will make hair grow and that it will stop falling hair in two weeks. The A. M. A. Chemical Laboratory reports that Van Ess Special Dandruff Massage is a perfumed liquid which separates into two layers on standing. The upper layer consists essentially of a petroleum oil which appears to be kerosene. The lower layer appears to be composed of water and alcohol containing small amounts of quinin sulphate, coloring matter and perfume. The laboratory concludes that it is probable that a mixture of 35 parts of kerosene, 15 parts of alcohol denatured by the addition of 2 grains of quinin sulphate per fluid ounce and 50 parts of water would have whatever therapeutic properties the Van Ess Special Dandruff Massage possesses. (Jour. A. M. A., Oct. 27, 1923, p. 1461).

Book Announcements

A Practical Text-Book of Infection, Immunity and Biologic Therapy. With Special Reference to Immunologic Technic. By JOHN A. KOLMER, M. D., Dr. P.H., D.Sc (Hon.) Professor of Pathology and Bacteriology in the Graduate School of Medicine, University of Pennsylvania; Member of the Research Institute of Cutaneous Medicine, Philadelphia. With an introduction by ALLEN J. SMITH, M. D., Sc.D., LL.D., Professor of Pathology in School of Medicine, University of Pennsylvania. Third Edition, Thoroughly Revised and Mostly Rewritten. 8vo. of 1210 pages containing 202 original illustrations, 51 in colors. Philadelphia and London. W. B. Saunders Company. 1923. Cloth, price \$12.00 net.

The Care of the Baby. A Manual for Mothers and Nurses, containing Practical Directions for the Management of Infancy and Childhood in Health and Disease. By J. P. CROZER GRIFFITH, M. D., Professor of Pediatrics, University of Pennsylvania; Physician to the Children's Hospital, etc. Seventh Edition, Thoroughly Revised. Philadelphia and London. W. B. Saunders Company. 1923. Cloth, \$2.50 net.

Diseases of the Skin. By RICHARD L. SUTTON, M. D., LL.D., Professor of Diseases of the Skin, University of Kansas School of Medicine; Former

Chairman of the Dermatological Section of the American Medical Association; etc. Fifth Edition, Revised and Enlarged. C. V. Mosby Company. St. Louis. 1923. 8vo. 1214 pages with 1069 illustrations and 11 colored plates. Cloth, \$10.00.

An Introduction to the Study of Mental Disorders.

By FRANCIS M. BARNES, JR., M. A., M. D., Associate Professor of Nervous and Mental Diseases, St. Louis University Medical School; Consultant Neuropsychiatrist to U. S. Veterans' Bureau Ninth District, St. Louis, etc. Second Edition. St. Louis. C. V. Mosby Company. 1923. 8vo. 295 pages. Cloth, price \$3.75.

Diagnostic Methods. A Guide for History Taking,

Making Routine Physical Examinations and the Usual Laboratory Tests Necessary for Students in Clinical Pathology, Hospital Internes, and Practicing Physicians. By HERBERT THOMAS BROOKS, A. B., M. D., F. A. C. P., Professor of Clinical Medicine, College of Medical Evangelists, Los Angeles, Cal.; Formerly Professor of Pathology, College of Medicine, University of Tennessee, Memphis. Fourth Edition. St. Louis. C. V. Mosby Company. 1923. 8vo. 109 pages with fifty-two illustrations. Cloth, price \$1.75.

Alcohol and Prohibition in Their Relation to Civilization and the Art of Living.

By VICTOR G. VECKI, M. D., San Francisco, California. Philadelphia and London. J. B. Lippincott Company. 12mo. 165 pages. Cloth, price \$2.00.

Rhus Dermatitis. From Rhus Toxicodendron, Radicans and Diversiloba. (**Poison Ivy**). Its Pathology and Chemotherapy. By JAMES B. McNAIR. The University of Chicago Press, Chicago, Illinois. 8vo. 298 pages. Cloth.

Public Health Exhibit in New York.

Early in November there was held in New York City a public health exhibit, demonstrating the facilities available at marine hospitals and other relief stations for the medical and hospital care and treatment of beneficiaries of the Public Health Service. The exhibit occupied eight booths and covered about 800 square feet of floor space. It showed a complete surgical operating suite; a dental operating suite; a modern X-ray machine which was operated for the benefit of visitors; a suite showing modern equipment for physio- and hydrotherapy; an ambulance; a model ship's medicine chest and the operation of the medical-advice-by-radio service. The exhibit was given by the U. S. Public Health Service in co-operation with the American Marine Association.

Have you looked over the advertisements this month? If not, please do so before putting down your journal. Mention this journal in writing them.

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DECEMBER, 1923

No. 9

Editorial

Heart Disease In Early Life.

This is a national question. It is closely related to public health of young citizens. It is a companion problem of rheumatic infection of youth. Can we not agree that rheumatic infection is due to a specific organism, streptococcus? For the past twenty years the bacterial origin of rheumatic fever has been under question, but now it seems quite clear, after widespread investigation and after proceeding to the conclusion with proper scientific caution, that we may conclude that the bacterial cause of rheumatic infection, as shown in articulations of bones, is also the cause of acute heart disease, and that the crippled heart results therefrom. Primary attacks of endocarditis can usually be traced to tonsil infection, and chronic heart lesions follow.

Allen, at Glasgow, emphasizes the magnitude of the problem by citing the following facts: "in 1921, 53,710, or 11.7 per cent of deaths at all ages and from all causes in England and Wales were due to heart disease, and this did not include disease of blood vessels." Rheumatism accounted for about one-half to one-third of the deaths due to heart disease in the wards of a general hospital. He cites America on this point and says that 11 per cent of the total deaths were due to heart disease. An examination of 198,304 children

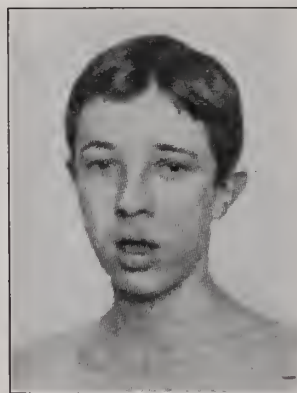
in eight schools of Glasgow showed that about .6 per cent had organic heart disease. Taking Great Britain, Allen estimates that there are from 40,000 to 50,000 children of school age who have organic heart disease.

THE SATURDAY MORNING CHILD'S CLINIC BY FAMILY DOCTOR.

In view of the well known widespread prevalence of rheumatic infection among children at the school age and in view of the great necessity for the early discovery of the causative factor, it would seem wise, in addition to the routine examinations made at the schools by the school physicians, that children be sent periodically on Saturday mornings to the office of the family physician for careful inspection and study as to possible infection of the nose, throat and teeth, or the possible presence of evidences in the body of rheumatic infection or the determination of cardiac lesions. As a result of such diagnostic inquiry, should positive signs be found, at once, by a sympathetic agent, the family doctor, proper measures might be undertaken for the correction of infections and for careful instructions in the case of the crippled heart.

The Bacteria.

- | | |
|------------------|-----------------------------------|
| 1. Streptococci | 3. Staphylococci |
| S. hemolyticus | Aureus and albus |
| S. viridans | 4. Meningococci |
| S. rheumaticus | 5. Tubercle bacilli |
| S. mucosus, etc. | 6. Colon bacilli |
| 2. Pneumococci | 7. Diphtheria bacilli and others. |



BACTERIAL VICTIM.
The Result.

- | | |
|-----------------|--------------------------|
| Tonsillitis | Thyroiditis |
| Rheumatic fever | Iritis |
| Endocarditis | Erythema nodosum |
| Myocarditis | Herpes |
| Pericarditis | Meningitis |
| Acute chorea | Tuberculosis and others. |
| | Death often results. |

THE FAMILY PHYSICIAN'S TRAINING.

For this service, probably a brief course of study on the part of the family doctor may be in order. He may need just a little brushing

*Copy of photo in Hare's Practical Diagnosis.

up for his child's clinic in the matter of examination of the child's nose and throat. He will need a winning smile, an air of friendliness, a presence of gentleness. He will need a head mirror and a tongue depressor. He will require, it may be, a retractor or some instrument to make some pressure on the tonsils. He will need a hand mirror to reflect light, and a nose speculum. He will need a stethoscope. He will need a clinical thermometer. He should weigh his patient: he should examine the heart carefully, before and after exercise. He should examine the lungs and also the urine. Were such a simple clinical study of children followed by intelligent family physicians at Saturday clinics, much sickness and suffering might be prevented, and particularly in the field of rheumatic infections.

Such a plan, of course, can only be useful if the general practitioner takes seriously the examinations of such children. Surely it is easy of operation; on every country side, in every town and city throughout the land, an office clinic for school children could be held at a Saturday morning hour when children are free from school duties and transportation by automobile easily obtainable. This could be agreed upon by the doctor, the parents and the children. Such a method of periodic study of children would do much to ward off impending systemic infections and to prevent chronic heart maladies of later life.

Early Symptoms and the General Practitioner.

Sir James Mackenzie is emphasizing a newer and finer insight into the primary manifestations of disease. Under this system of approach in the study of ill health, the recognition of dysfunction in its initial forms is demanded. The interpretation of the full significance of beginning symptomatology is needed in modern medicine. The old habits of mental analysis must be reformed and a keener sense of the real meaning of apparently insignificant physical disturbances is needed by general practitioners as well as specialists. The time-worn descriptions of diseases, useful and important as these have been and are, must be given a less important place in medical literature. Text books and much current literature have dealt with descriptions of disease, as displayed in the late, terminal, and often irremediable and fatal stages. This is illustrated in the

description of the signs and symptoms of chronic tuberculosis in the human body; in the all but moribund state of Bright's disease; and in the gross and late signs of heart disease, as shown in such phenomena as cough, dyspnoea, hemorrhage, oedema, dropsy, *et cetera*.

The new movement, championed by Mackenzie, would bestir the general practitioner to an understanding and study of disease in its very beginnings; to cultivate a mental acumen for a more accurate sensing of the oncoming malady by a true interpretation of the earliest disturbances. Every disease must display or give evidence of its presence in the initial stage. In this great threshold of disease, knowledge of vast importance awaits alert medical appreciation. The general practitioner of medicine may find most satisfying efforts here. For it must be granted, that much of the present day abundant surgical pathology in man is, or may be, explained by the failure of the medicine of the past to early understand the significance of beginning ill health. For instance the understanding of focal infections may serve to prevent the gastric ulcers, the infected gall bladders, the pyelitis, and other pathological states that the drainage and removal procedure of modern surgery so excellently handles. The same may be said of beginning gastric disturbances as has been said so well by surgeons, themselves, of early cancer.

But this is not alone a problem for the physician. The layman necessarily must participate largely as a factor in this stage of medical progress. Simultaneously with improvement in the acumen of the physician for the beginnings of disease must come an education of the public in the fundamentals of ill health and its early manifestations. Many laymen live the "dyspeptic life" and do not believe the distress from indigestion to be anything but "normal" to man. So insidious and stealthy have been the onward movements of symptomatology in such cases, such persons have not felt the significance of the dysfunctioning stomach nor thought of these signs as harbingers of gross pathological processes which may finally require surgical intervention.

Again, many a layman does not understand the significance of the periodic headache, the dimness of the vision, sense of bodily tension, the forceful heart beats, the slight

dyspnoea on slight exertion, often felt in the fifth decade; these individuals feel that these slight disturbances are "natural" at the age. Again, many women have signs of incipient and beginning hyperthyroidism which may escape notice in the remedial stage.

So it is easy to see that while the profession needs and must acquire a rather keener sense for the understanding of the symptoms of ill health in its earliest stages, the more essential and more fundamental movement in this direction must be made in the minds of the people themselves. This reduces the matter to that well understood, but rather poorly accomplished public need of a nation-wide publicity as to the nature and early manifestations of diseases as we find them in this country.

While organized medicine and public health bodies may back such a movement, it would seem that the public press under skilled and intelligent direction, both by governmental agencies and professional organizations, would be more potent in propagating an understanding of this public need.

From the standpoint of Sir James Mackenzie's principles of symptomatology, the problem relates to physicians and the following quotations may be given to indicate the points he endeavors to sustain:*

"A great deal of time and labor is spent on getting records, and an enormous mass has been accumulated. Everyone recognizes that they should be of inestimable value, but somehow or other the good results are never commensurate either with expectations or with the labor spent. If one asks a physician or surgeon what use he makes of the records of his predecessors, who it may be, for a quarter of a century, had been piling them up, he will reply that nobody ever looks at them! This fact has been recognized, and strenuous attempts are being made to remedy this state of affairs. But there is little prospect of success so long as we remain ignorant of the phenomena of ill-health. The most favored method today is to have each patient examined by a great many specialists. Each specialist may find something wrong, and all their findings are carefully recorded. But such records are of little help, as they do not tell us the outcome of the complaint. This is recognized in some quarters, and the patients are to be 'followed up.' But what is it that should be watched in the following up, and which of the specialists is to do it? The object is to note the modification in the symptoms with the progress of the disease, but in the present state of knowledge of the nature of symptoms, only a very imperfect or useless record can be kept."

"Large numbers of perfectly healthy people are rejected for life insurance, and for entrance into the Services, have their lives restricted, and are subjected to various forms of treatment, because some sign as a murmur or an irregularity of the heart

is detected. Modern medicine is developing along new lines, in which numbers of specialists are combining to make a more thorough examination of each patient. That each specialist may frequently find symptoms belonging to his special department is to be expected, seeing that in a sick man every organ may be disturbed. But if each or all of them is asked what is the nature of the ill-health which is provoked by the disturbance, no clear information can be obtained. That does not mean that each specialist may not do good by his treatment, or that such a combination may not be successful, but the point is that there is not that knowledge which enables the specialist to understand the relation of the disturbance which he detects with ill-health, and in consequence of the absence of this knowledge he is forced to treat patients whose sufferings cannot be relieved on the same lines as those who can be relieved."

* * *

"Many examples of the evil effects of specialism in the practice of medicine could be cited, and the following may be taken as an example. A problem which is ever cropping up in general practice is how to deal with patients with affections of the heart who become pregnant. A perusal of recent obstetric books shows that the writers have so imperfect a knowledge of this subject that their opinions are of little value. The heart specialist has never had the opportunity of studying the effect of pregnancy in either the normal or diseased heart. The absence of this kind of knowledge often has calamitous results."

* * *

"The recognition that there is an urgent need for a new outlook in medicine is not the result of a superficial view or of a hasty survey. It is forty-four years since I entered upon the practice of medicine as a general practitioner. After a few years it gradually dawned upon me that I was profoundly ignorant of the nature of the complaints for which I was consulted. If a patient had a pain I might be able to give relief, but when I asked myself how was the pain produced and how my remedy acted, I had to admit I did not know. When I detected in a patient a murmur in the heart, or an irregularity in its action, I looked upon these as signs of serious significance and proceeded to treat them according to the fashion of the day. But when I asked myself in what way they indicated danger, I could not tell. The same blank ignorance faced me when I looked closely into nearly every form of complaint—whether trivial or serious. At first I thought my ignorance was peculiar to myself, but I soon found that neither the consultants to whom I brought my patients, nor the books I read, could give me the kind of knowledge I wanted.

"I therefore resolved forty years ago to improve my own knowledge, and for that purpose I set myself two objects—(1) to find out the nature and mechanism of individual symptoms, and (2) to find the bearing the cause of the symptom had on the patient's health in the present and in the future. From that time onward I have steadily pursued this inquiry. Needless to say, progress has been slow and difficult. One great obstacle was my profound ignorance of the manner in which the functions of the body were carried on. In striving to remove this ignorance, I discovered that the knowledge essential to the attainment of my object in many instances did not exist, and I had to devise measures to get this knowledge. Many were the failures, but gradually a measure of success was achieved. I kept reviewing the steps I had taken, and studied the reasons of success to find the reason for the failures, till

*Sir J. Mackenzie, *Lancet*, November 3, 1923, pages 964-5.

I finally was able to understand the reason for the slow progress of medicine in dealing with the ill-health common among the people, and recognized a great field of investigation which had been neglected, but which is absolutely essential for the progress of medicine and its intelligent practice."

Surgery and Physiology, or the Surgeon as a Physiologist.

No longer does surgery lean alone upon anatomy as its main support. The saying that anatomy is the sole basis of surgery must, in present times, be modified. An accurate knowledge of anatomy is no less essential to the art of surgery than heretofore; the manual work of the surgeon, the technique of the operation, as applied to the anatomy of the patient, is just as important as ever. Modern surgery is no longer considered a mere mechanical art, although the mechanical and physical alterations of the anatomical structures, incident to operative procedures, as well as the dangers involved in such, have a fundamentally important place in the surgeon's work. In the work of Dr. Crile, at Cleveland, and in his splendid contributions to the science of surgery we have an illustration of the point under comment. A skilful manipulation and readjustment of anatomical structures, during the process of surgical operations, call for a special knowledge of anatomy. But the more advanced improvements in surgical problems and surgical methods are found in the adjustment of the body, subjected to changes resulting from surgical interventions to a newer consideration for function or physiology.

So today, surgeons are thinking more in terms of physiology. Many modern surgeons, both in this country and abroad, having accomplished a high standard of skill in technique of operative procedures, are turning from problems of dissection to problems of physiology. Many are becoming earnest physiologists. In this way physiology is becoming an aid to better surgery.

The Clock of Life is wound but once
 And no man has the power
 To tell just when the hands will stop—
 At late or early hour.
 Now is the only time you own;
 Live, Love, Toil, with a will;
 Place no faith in "Tomorrow," for
 The Clock may then be still.

News Notes

Christmas Greetings

**and Best Wishes for a Happy and Prosperous
 1924 to all our Readers**

Medical Activities In Wise County, Virginia.

The Daily Progress, of Norton, Va., in a recent issue featuring the Appalachian National Park, tells much of the progress in all lines of work in the southwestern section of the State. It is pleasure to note that the medical profession is no laggard in successes being attained there. It is stated that Wise County "has grown in thirty years from the poorest and one of the least known, in the State, to the richest and one of the most progressive."

A Health Department was established in Wise County in 1917, which employed a health officer for his whole time, until his activities were terminated by his entering the World War. Later, the full work of the Department was resumed and a venereal disease clinic was also established. Dr. W. R. Culbertson is now health officer of Wise County and, under his administration, a great deal of excellent health work is being done in this county.

Norton has also one of the best hospitals of the southwestern section. It was established about three years ago and is a 30-room hospital with X-ray and all other modern apparatus. The staff includes Dr. J. A. McGuire and Dr. G. B. Setzler, of Norton, and Dr. J. Francke Fox and Dr. W. H. St. Clair, of Bluefield, W. Va.

Richmond Academy of Medicine and Surgery.

At the meeting of the Academy, held November 27th, a new Constitution and By-Laws were unanimously adopted. The essential features in these were that the Richmond Academy of Medicine and Surgery should hereafter be designated as the Richmond Academy of Medicine and that the business and scientific work of the Academy would be divorced, the business activities being put under charge of a body of trustees consisting of the incumbent president and the four former latest presidents of the Academy, and that the scientific program should be delegated to a committee of three who, with the president and the board of trustees, would formulate the scientific work of the Academy during each year. This departure is considered a conser-

vative one and for the best interests of the Academy as a whole. Final action on all important measures affecting the interests of the Academy will be left to the membership for ultimate action. This reorganization of the Academy and its methods and activities is in line with the progressiveness of the profession, will be constructive, and of great benefit in furthering the scientific interests of the members, and will give them a better opportunity for serious minded scientific work. The offices of secretary and treasurer are to be combined.

During the past year, the work of the Academy has been of an unusually high character and there has been a personal enthusiasm and unity of action that has been most helpful.

Another Virginia Member, American College of Surgeons.

In our November issue, in giving names of Virginia surgeons elected to fellowship in the American College of Surgeons, at its recent meeting in Chicago, we failed to include the name of Dr. George W. McAllister, of Hampton. We regret the omission, which was brought to our attention by a friend of Dr. McAllister's. This makes a total of six from Virginia elected to fellowship in the College this year.

The Johnston-Willis Hospital

Has moved into their handsome and thoroughly modern new building at Kensington and Colonial Avenues, Richmond. The formal opening was held on December 10th.

The hospital had outgrown its old quarters on Franklin at Sixth Street, where it has been operating since its foundation in 1909 by Drs. George Ben Johnston and A. Murat Willis, and their associates, for the accomodation of their private patients.

The new location is particularly attractive, overlooking as it does the grounds of Battle Abbey and having spacious grounds of its own. The building is 165 feet by 40 feet, is six stories with a tiled roof garden. There are accommodations for 125 patients, with telephone service in each private room. The construction is strictly fire-proof, being reinforced concrete frame, brick and stone exterior, partitions of hollow tile and terrazza floors. The hospital is complete in every respect; each department has been carefully arranged for convenience of patients, doctors and nurses, and the most modern equipment is installed

throughout. The operating suite contains three operating rooms and other rooms for special surgical examinations and treatments. The X-ray laboratory has spacious quarters and is equipped with the most modern and approved apparatus for diagnostic and therapeutic work, including a powerful, high voltage machine for deep therapy administration. Portable apparatus is also provided for bedside work and study of special cases during operation. The hospital possesses an amount of radium adequate for any purpose for which this element is indicated as a therapeutic agent. The provisions for the care of maternity cases includes a modern delivery-room and nursery; the facilities for the care of new-born infants have been worked out and completed in detail.

The clinical laboratory is complete and includes electro-cardiographic and basal metabolic units. It is possible to take electro-cardiographs on any floor or room in the hospital. Ample quarters are provided for hydrotherapy. A special feature of the culinary department is a complete cafeteria system for the nurses and doctors. This is an innovation in this city, but has proved highly satisfactory in some of the other more modern hospitals elsewhere. There is a complete refrigerating plant which, besides cold storage, provides ice and cold water throughout the building.

There are a number of rooms with private baths and each floor has a sun-parlor. In addition, a spacious sun-parlor on the roof opens on the tiled roof garden, which commands a beautiful view of the city. This feature is particularly attractive for convalescent patients. Here they can enjoy the open air and sunshine and can see their friends in homelike surroundings. Visiting physicians are invited to inspect the hospital at any time.

The McGuire Clinic.

The McGuire Clinic in conjunction with St. Luke's Hospital opened its doors December the first. The Clinic Building, which is connected with every floor of the hospital, has practically been rebuilt from basement to roof and supplied with all the facilities of a large modern professional office building.

The Department of Surgery, Gynecology and Urology will be under Dr. Stuart McGuire, Dr. W. Lowndes Peple, Dr. R. C. Fravel and Dr. Beverly F. Eckles. The Department of Orthopedic Surgery will be under Dr. W. T.

Graham. The Department of Internal Medicine will be under Dr. Garnett Nelson and Dr. Hunter H. McGuire. The Department of Pathology and Radium Therapy will be under Dr. S. W. Budd. The Department of Roentgenology will be under Dr. A. L. Gray and Dr. J. L. Tabb. The Department of Ophthalmology, Otolaryngology and Rhinology will be under Dr. W. R. Weisiger. The Department of Dentistry will be under Dr. John Bell Williams and Dr. Guy R. Harrison. The Department of Obstetrics will be under Dr. Virginius Harrison. The Business Manager will be Mr. G. H. Winfrey, former Secretary and Treasurer of the Medical Society of Virginia.

The Department of Roentgenology under Dr. Gray and Dr. Tabb will be equipped with the latest improved X-ray apparatus for X-ray diagnosis and the latest model machine for administering the high voltage X-ray treatment. This deep therapy apparatus promises much in reaching the more deeply seated malignant conditions hitherto inaccessible.

The Radium Laboratory under Dr. Budd has an adequate supply of radium to meet all needs. It will be used in connection with Surgery and Roentgenology in the treatment of many of the cases of malignancy as well as other pathological conditions.

The Department of Medicine, under Dr. Nelson and Dr. Hunter McGuire, is equipped with a new electro-cardiographic apparatus, an alpine light, an apparatus for estimating basal metabolism, and all other equipment needed in the diagnosis and treatment of medical diseases.

With a virtually new office building in intimate connection with an established hospital, with new equipment and a staff of men experienced in their several specialties, the organization should be a great success.

New Superintendent at Stuart Circle Hospital.

Miss Charlotte Pfeiffer has been elected by the Board of Directors as Superintendent of the Stuart Circle Hospital, Richmond, to succeed Miss R. Z. Van Vort. Miss Pfeiffer arrived in Richmond December 1st and will assume charge of the Hospital on December 16th. She comes on the recommendation of Dr. A. R. Warner, Executive Secretary of the American Hospital Association. The Stuart Circle Hospital has always enjoyed a high rating with the American Hospital Association and with

the American College of Surgeons and, when the necessity for finding a successor to Miss Van Vort arose, Dr. Warner was consulted and as a result of this correspondence Miss Pfeiffer was recommended. She has visited Richmond for conference and is enthusiastic about her new work.

Miss Pfeiffer's first connection with hospital work was as Deaconess in the Lutheran Church. She thus entered on her work as a life of service, and has served in all capacities in hospital work. She has taken courses in home economics, has done social service work, especially in organization, and did field work under the direction of United Charities in Chicago. She took the post-graduate executive course in the Illinois Training School in 1920 and a post graduate course in practical hospital administration at the Bridgeport Hospital, Connecticut. For the past four years she has been principal of the school of nursing at the Deaconess Hospital in Milwaukee, where she made notable success. She enters on her work in Richmond with a broad training and a successful practical experience, and with ideals and a vision that peculiarly fit her to carry on the work at Stuart Circle Hospital.

Married.

Dr. Joseph Thompson McKinney and Miss Ruth Markley, both of Roanoke, Va., November 14.

Dr. William Percy Jones and Miss Eliza Palmer, both of Urbanna, Va., the latter part of October.

Dr. R. L. Hudnall, Beverlyville, Va., and Miss Mary E. Robertson, Heathsville, Va., November 7, in Baltimore, Md.

Dr. Harry B. Sanford and Miss Alice Smith, both of Richmond, Va., November 14.

Dr. Powell Garland Dillard, Lynchburg, Va., and Miss Nannie Sue Hoge, of Pembroke, Va., November 20.

Dr. John W. Turman, Richmond, Va., and Mrs. Dell Williams Peoples, Warrenton, N. C., October 27.

The Petersburg Medical Faculty,

At its annual meeting on November 22, elected Dr. D. D. Willcox president; Drs. J. R. Beckwith and E. W. Young vice-presidents; Dr. C. M. McCuiston corresponding secretary; and re-elected Dr. J. M. Harwood secretary-treasurer. All are of Petersburg. Drs. J. Bolling Jones and Fletcher J. Wright were appointed to arrange for the annual meeting

of the Southside Virginia Medical Association, which was held in that city on December 11th.

Arlington County Medical Society.

At the regular meeting of this Society, held November 7th, Dr. Stacy T. Noland, Clarendon, was elected president, and Dr. B. H. Swain, Ballston, was re-elected secretary-treasurer. The Society decided that, instead of meeting quarterly as hertofore, they would hold meetings only twice a year—on the first Wednesdays in May and November.

The Augusta County Medical Association

Held its regular tri-monthly meeting in Staunton, November 7. Present officers of the Association are: President, Dr. Alex. F. Robertson, Jr., Staunton; vice-presidents, Drs. F. E. Hamlin, Staunton (at present in Philadelphia taking post-graduate work), T. W. Hankins, Fordwick, and H. F. White, Fishersville; secretary, Dr. H. G. Middlekauff, Weyers Cave; treasurer, Dr. J. L. Alexander, Staunton. Meetings are held quarterly.

Clinic for Crippled Children.

Dr. William Tate Graham, orthopedic specialist of Richmond, held a clinic at Courtland, Va., November 24, by special request of the Red Cross Chapter and Board of Public Welfare of Southampton County. He examined about twenty-five children and suggested that hospital treatment should be helpful to several. He was assisted in the work at the clinic by Dr. W. T. McLemore, chairman of the Red Cross Nursing Committee, Miss Mary L. Babb, Red Cross secretary and Welfare superintendent, and Dr. and Mrs. R. L. Raiford.

Dr. B. L. Carter's Daughters,

Misses Mary Lee and Raeburn Carter, of Blue Spring Run, Va., spent the Thanksgiving holidays in Richmond.

The American Association for the Study of Goiter,

Composed of goiter surgeons, pathologists, anaesthetists, internists, and radiologists, will hold its annual meeting in Bloomington, Ill., January 23, 24, and 25, 1924. The program, to be issued in a few days, will list a number of excellent papers, demonstrations, and diagnostic and operative clinics. Dr. E. P. Sloan, of Bloomington, is president, and Dr. J. D. Moschelle, of Indianapolis, secretary.

Dr. Edgar W. Robertson,

Onancock, Va., who was very ill for several

weeks, is much improved and hopes soon to be at work again.

Dr. Charles R. Robins,

Richmond, acted as toastmaster at the banquet given by the local chapter of the Omega Upsilon Phi fraternity in Richmond, on November 24.

Dr. J. B. Tuttle,

Of Craigsville, Va., is spending the winter in Florida, having made the trip there in his car. He will return to his home in Virginia in the Spring.

Dr. D. Lane Elder

Was elected one of the directors of the DuPont Club of Hopewell, at its annual meeting held last month.

Offer to Endow Chair of Music.

A proposal has been made by Drs. Wm. J. and Chas. H. Mayo to endow a chair of music in the Rochester, Minn., public schools, by annually placing the sum of \$2,000 in the hands of the schools' board of trustees.

Elected Members of Board of Country Club.

Drs. Robert C. Bryan and Robert S. Preston, both of Richmond, were among the five new members of the board of governors of the Country Club of Virginia, elected at the annual meeting in November.

Dr. E. M. Magruder,

Charlottesville, Va., was re-elected chieftan of the American Clan Gregor Society at their annual meeting in Washington, recently.

Dr. Alfred B. Claytor,

Bedford, Va., has been elected surgeon of the Watts-Graves Camp, Sons of Confederate Veterans, of that city, for the coming year.

Dr. Edward Latane Flanagan

Announces the opening of his offices in Medical Arts Building, Franklin at Second Streets, Richmond. His practice will be limited to X-ray diagnosis and treatment.

Two Newport News Doctors Have Narrow Escape.

Drs. R. A. Davis and Morris P. Beecroft, of Newport News, Va., narrowly escaped serious injuries on Thanksgiving Day when, with a party of friends, they were on their way to the foot ball game in Richmond. A short distance from this city, the car turned turtle and all of its occupants, except the driver, were thrown clear of the car. All of the men received only slight injuries.

Some Good Hunters Among the Doctors.

Drs. J. W. Abbitt and L. J. Roper, Portsmouth, Va., Dr. H. M. DeJarnette, Fredericksburg, Va., Drs. James Morrison and J. R. Gorman, Lynchburg, and Dr. Thos G. Hardy, Farmville, Va., are among the Virginia doctors who have had some good luck hunting this Fall.

New Dean of Johns Hopkins Medical School.

Dr. Lewis Hill Weed, professor of anatomy at Johns Hopkins University Medical School since 1919, has been elected dean of the Medical School to succeed Dr. J. Whitridge Williams. Dr. Williams, who has been dean of this school for the past thirteen years, recently resigned that he might more fully devote his time to the new women's clinic of Johns Hopkins Hospital, of which he is director.

The Virginia Public Health Nurses' Association

Met in Richmond the last week in November. Practically every section of the State was represented by those interested in health work and reports showed that much good work was being accomplished by the work of these nurses in co-operation with the State Board of Health. Dr. Ennion G. Williams, State Health Commissioner, and Dr. Roy K. Flannagan, assistant State Health Commissioner, addressed the Association at the opening meeting. Dr. Mary E. Brydon, head of the child welfare division of the board of health, presided at a round table discussion of matters pertaining to her department. Several others interested in public health work in Virginia also addressed the meetings.

Rex Hospital Has Addition.

An addition including thirty-five beds for children was recently opened at Rex Hospital, Raleigh, N. C. The money for this addition was given by Mr. W. H. Williamson, of Raleigh, as a memorial to his wife.

Pine Camp Enlarged.

Pine Camp, Richmond's municipal tuberculosis hospital, has been much enlarged and improved and had its formal opening November 17. Appropriate exercises marked the opening of the additions, following which the buildings were inspected by the visitors, and refreshments were served. Great credit is due Dr. E. C. Levy, Director of Public Welfare of Richmond, and his able assistants for their

untiring efforts in behalf of the enlargement of this hospital.

Pine Camp was founded by the Richmond Tuberculosis Association in November, 1910 and was taken over by the city in 1916. Former capacity of the camp has been thirty-six patients; with the additions, it is now able to care for eighty-four. It is expected later to increase the capacity to ninety-two beds.

Rear Admiral Cary T. Grayson,

Washington, D. C., delivered an address in Danville, Va., December 5, under the auspices of the Wednesday Afternoon Club. His subject was "Heredity and Training."

Dr. S. Josephine Baker,

Of New York, has been appointed consulting director in Maternity and Infancy and Child Hygiene of the Children's Bureau of the U. S. Department of Labor. Until last Spring, Dr. Baker was for twenty years director of the Bureau of Child Hygiene of the New York City Department of Health.

The Association of Surgeons of the Chesapeake and Ohio Railway

Held their seventh annual meeting at White Sulphur Springs, W. Va., November 16 and 17, under the presidency of Dr. S. W. Hobson, of Newport News, Va. There was an attendance of over 200 and the sessions were interesting and pleasant throughout. On the first afternoon, the members of the Association presented Dr. W. T. Oppenheimer, of Richmond, Va., chief surgeon of the road, with a motor car, as an expression of their esteem and affection, the presentation speech being made by Dr. J. M. Salmon, of Ashland, Ky. Officers elected for the ensuing year are: President, Dr. C. C. Coleman, Richmond, Va.; vice-presidents, Drs. L. L. Bigelow, Columbus, O., J. E. Cannaday, Charleston, W. Va., H. W. Porter, Louisa, Va.; secretary-treasurer, Mr. George E. Meanley, Richmond, Va. Members of the executive committee are: Drs. W. E. Vest, Huntington, W. Va., H. U. Stephenson, Richmond, Va., C. C. Garr, Lexington, Ky., E. H. Griswold, Peru, Ind., Eric Twachtman, Cincinnati, O., and W. R. Laird, Montgomery, W. Va.

Xmas T. B. Seals.

Funds from this sale are used to support free tuberculosis clinics, public health nurses, indigent patients at sanatoria, and for preventive work among children, such as fresh air

classes, nutrition classes, summer camps and the Modern Health Crusade. Last year, Virginia raised \$55,568.30, the major portion of which was used for health work in the counties and cities in which it was raised. Virginia raised 2.3 cents per capita for population. A per capita rate as high as 8.5 for the population was raised in one state. Can we not better the amount raised in Virginia? Buy your allotment promptly.

Dr. J. Hampton Hare,

Of Newland, Va., was a recent visitor in Washington, D. C.

Physicians' Scholarships Awarded.

The American Child Health Association announces that its resident and travel scholarships for physicians have been awarded to the following: Dr. Charles Armstrong, Salisbury, N. C.; Dr. William W. Bauer, Milwaukee, Wis.; Dr. R. L. Carlton, Winston-Salem, N. C.; Dr. Eugene C. Chimene, Minneapolis, Kan.; Dr. William De Kleine, Saginaw, Mich.; Dr. Seymour Fiske, New York, N. Y.; Dr. Arthur M. Kimberly, Bristol, Conn.; Dr. George A. Lamont, Vancouver, B. C.; Dr. George N. Leonard, Albany, N. Y.; Dr. Marie M. Long, Memphis, Tenn.; Dr. George C. Marlette, Bay Minette, Ala.; Dr. Walter R. Moore, St. Joseph, Mo.; Dr. Russell B. Sprague, Yarmouth Port, Mass.; Dr. Thomas D. Walker, Macon, Ga.; Dr. Ruth Weismann, Dorchester, Mass. The purpose of these scholarships is, broadly, to stimulate interest in child health work and to provide means for better training of physicians along this line. One hundred and one applications were received from thirty-six states.

On Democratic Committee of Richmond County.

Drs. H. L. Segar, Warsaw, Va., and B. A. Middleton, Emmerton, Va., have been elected members of the recently reorganized Democratic Committee of Richmond County, Va.

Dr. and Mrs. J. Alfred Riffe,

Covington, Va., were recent visitors in Richmond.

Dr. D. Hunter Marrow,

After spending the summer months at his old home at Union Level, Va., has returned to Daytona, Fla., for the winter.

Sanatorium Destroyed by Fire.

Much credit is due the nurses for their

heroism in saving the patients when Gaston Sanatorium, Gastonia, N. C., was almost completely destroyed by fire on the afternoon of November 16. The loss, estimated at \$50,000, is only partially covered by insurance.

Dr. William S. Thayer,

Emeritus professor of medicine in Johns Hopkins University, Baltimore, recently addressed the senior medical class of the Medical College of Virginia, his subject being "Bacterial Endocarditis."

Dr. and Mrs. B. L. Phillips,

Richmond, are now much improved after being in a local hospital for sometime for injuries suffered in an automobile accident.

Mary Washington Hospital Awards Diplomas.

Eight nurses were awarded diplomas of graduation from the Mary Washington Hospital, Fredericksburg, Va., November the 9th. Dr. J. N. Barney presided, Dr. Frank C. Pratt presented the diplomas and Dr. C. Mason Smith made the presentation of the hospital pins.

Dr. W. L. Davenport,

Amelia, Va., was among those to make speeches at the opening of the Co-operative Warehouse in Amelia C. H., in November.

Dr. H. Orlando Bell

Has been appointed medical inspector of the Richmond Bureau of Health, to succeed Dr. Henry E. Davis, resigned. Dr. Bell entered upon his duties December 1, and will work with Dr. G. R. Maloney in the control of contagious diseases.

Dr. Bell is a member of the class of '20, Medical College of Virginia and since graduation has been connected with the New York Nursery and Childs' Hospital, and with the Willard Parker Hospital in New York City.

How About Your Magazine Subscriptions for 1924?

Have you placed orders for your magazines for 1924? If not, you can place all of these, new and renewals, through the office of the Medical Society of Virginia. It saves you trouble; it helps your Society. How about sending them in now? State when you wish subscriptions to begin.

Automobile Fatalities for 1922,

Just announced, show an increase of one per 100,000 in fatalities from automobile ac-

cidents in the registration area of the United States, during 1922. Virginia as a whole showed a very slight decrease from six to 5.8 per 100,000. This decrease was marked in Norfolk City, where the rate fell from 18.1 to 8.8 per 100,000. We regret to note, however, that Richmond did not participate in this improvement, her rate showing an increase of four-tenths of one per 100,000. Can't we lower this next year?

Impaired Hearing Helped by X-Rays.

Exceedingly apropos is the publication of a paper on "X-Ray as an Advance in the Treatment of Impaired Hearing" by J. J. Richardson, M. D., F. A. C. S., Washington, D. C., in the wake of a clinic held in Richmond recently during the National Osteopathic meeting. At this time, one of the members of the Osteopathic Association held clinics in this city at which it was stated that deaf people had their hearing completely restored. Dr. Richardson reports improvement varying from a slight degree to a complete cure in not less than 60 per cent of about 600 cases. The X-ray was used by him as an adjuvant, as he states that "Any discernible and corrigible anatomic or pathologic defect should, of course, receive all possible clinical aid" prior to the use of the X-ray.

National Board Bulletin,

Commencing October 1923, is to be published bi-monthly by the National Board of Medical Examiners, from Philadelphia, at the subscription price of 50 cents a year. This periodical has been started for the purpose of keeping the Board's candidates and others interested more fully informed of its program and progress.

In this connection, we might state that Part I only of the examinations will be held in February 1924, the exact date to be named later. Dr. J. S. Rodman, Philadelphia, is secretary-treasurer of the Board, and Mr. E. S. Elwood, 1310 Medical Arts Building, that city, managing director of the Bulletin.

Foreign Health Officers Entertained.

On December 4, the Rockefeller Foundation gave a dinner at Commodore Hotel, New York City, in honor of the foreign health officers representing eighteen foreign governments. These officers have been in the United States for the past three months under the auspices of the Health Section of the League of Nations, for the study and observation of

various types of public health organization. Dr. George E. Vincent, president of the Foundation, presided.

The visit of these health officials to the United States represents the third general interchange of public health personnel arranged by the Health Section of the League of Nations. The first was in Belgium and Italy in 1922, and the second in England and Poland in the Spring of 1923. A contribution from the International Health Board of the Rockefeller Foundation, amounting to \$60,080 a year, for a period of three years, made possible this international interchange of public health personnel.

American Academy of Ophthalmology and Otolaryngology.

At the annual meeting of this association, held recently in Washington, D. C., Dr. Walter B. Lancaster, Boston, was elected president, and Dr. Luther C. Peter, Philadelphia, secretary.

Number of German Hospitals Close.

According to the *Journal of the A. M. A.*, during 1922, forty-five hospitals were forced to close in Prussia owing to financial stress. This included nine private hospitals with 1,049 beds in Berlin alone.

The Atlanta Graduate School of Physicians and Surgeons,

Atlanta, Ga., will have their formal opening on April 9, 1924. Dr. William Perrin Nicolson is dean, and Dr. Michael Hoke president of the faculty.

Centenary of the Lancet.

In October, the *London Lancet* issued a special number commemorating its one hundredth anniversary. Established in 1823 as a medical weekly, the *Lancet* has weathered full many a storm, but has come through them all as one of the leading medical journals of this day. This journal was established by a London practitioner named Thomas Wakely, and it is interesting to note that in its whole career it has had but five editors, all of them, with the exception of the present one, Sir Squire Sprigge, having been Wakelys. We wish this journal a continuance of its great popularity and influence.

The American Journal of Roentgenology and Radium Therapy,

The official organ of The American Roentgen Ray Society and the American Radium Society will appear in enlarged form in 1924.,

the increased pages being given to more illustrations, more abstracts and more original articles. Dr. A. C. Christie who was Colonel in charge of roentgenology in the U. S. Army during the war will be the editor. Dr. James T. Case, Dr. H. K. Pancoast and Dr. W. Duane will be the associate editors with a large collaborating staff of the leading roentgenologists in the country. The subscription price is \$10.00 and Journal will be published as formerly by Paul B. Hoeber, Inc., New York.

Burroughs Wellcome and Company

Extend a cordial invitation to the medical profession to visit the exhibition rooms in their new building at 9-11 East Forty-First Street, New York City, just off Fifth Avenue, opposite the Public Library. This firm's general offices for the United States are now installed in this building. Doctors visiting New York at any time will be welcomed to inspect the fine products put out by this Company.

The Southern Medical Association,

At its annual meeting in Washington, D. C., the middle of November, selected New Orleans, La., as the 1924 convention city, and elected the following officers: President, Dr. Charles L. Minor, Asheville, N. C.; vice-presidents, Dr. Robert C. Lynch, New Orleans and Dr. Thomas A. Groover, Washington, D. C.; secretary-manager, C. P. Loran, and editor of the Association's journal, Dr. M. Y. Dabney. Both of the latter of Birmingham, Ala., were re-elected.

Leprosarium to be Enlarged.

Construction is to be undertaken at once of the new buildings for the Carville, La., leprosarium. As cost of building has advanced since the appropriation was made by Congress, building of the infirmary will be delayed, but accommodations will be added to care for 204 additional lepers. There are at present 174 patients at this institution—some of them blind and much mutilated from the disease. There is already a waiting list of more than 100 and it is estimated that there are many more throughout the United States who should be segregated.

Wanted—

Experienced interne for 35-bed hospital; one capable of assisting in operations, giving anesthetics, doing laboratory work (no Wassermanns), and would prefer one who could do X-ray work. Address Box 359, Martinsville, Va. (Adv.)

Obituary

Dr. Charles Wesley Astrop,

A prominent physician and citizen of Surry, Va., died in Richmond, November 20, having been in failing health for several years. He was born in Brunswick, Va., August 18, 1858, and studied medicine at the Medical College of Virginia, from which he graduated in 1884. Several years later, he took a post-graduate course in New York. He had made his home in Surry since 1897, and practiced there until several years ago when he retired on account of his health. Dr. Astrop was a member of the Medical Society of Virginia and an ex-president of the Southside Virginia Medical Association. He is survived by his wife and a son, who is connected with the faculty of the University of Richmond. The burial was held at Fork Union, Va.

Dr. John Clancy Parish,

Smithfield, Va., died in his home at that place November 30, after a lingering illness. He was the only child of Mr. and Mrs. Thomas P. Parish, of that place, and was 34 years of age. He graduated in pharmacy from the Medical College of Virginia in 1910 and later returned there and studied medicine, taking his M. D. degree in 1914. At this time he was appointed to an internship at Memorial Hospital, Richmond. Upon completion of this service he returned to Smithfield, where he practised his profession and made for himself a large circle of friends and admirers. His parents and his wife, formerly Miss Allene Moore, of Richmond, survive him. The funeral was held with Masonic honors.

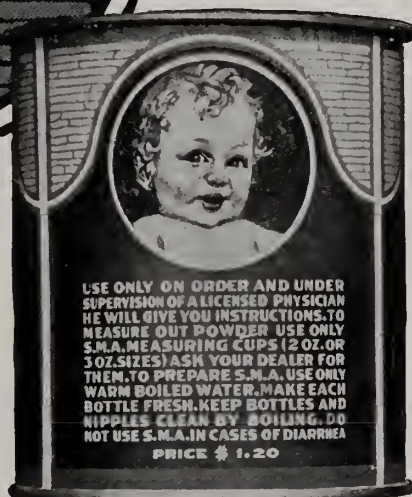
Dr. James Harvey Bogle,

Formerly of Roanoke, Va., died at Sebring, Fla., November 10, after a brief illness. Dr. Bogle was born in Bland County, Va., 55 years ago and, after graduating from the College of Physicians and Surgeons of Baltimore in 1893, located in his native county for several years. While there, he was a member of the Bland County Board of Health. Later, he moved to Roanoke, in which place he practiced until his removal to Florida several years ago. He had been a member of the Medical Society of Virginia since 1896. Dr. Bogle is survived by his wife and several children.



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Virginia Medical Monthly

OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Vol. 50, No. 10.
WHOLE No. 859.

RICHMOND, VA., JANUARY, 1924

\$2.00 A YEAR
20 CENTS A COPY

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—(Stevens Manual of Practice of Medicine, p. 384)



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Original Communications

THE PHYSIOLOGY OF THE PANCREAS, WITH SPECIAL REFERENCE TO THE PANCREATIC FUNCTION IN GENERAL METABOLISM.*

By THEODORE HOUGH, Ph. D., University, Virginia.

In view of the time which can reasonably be allowed for this paper, I have decided to limit myself to the physiology of the pancreas in the utilization of glucose in metabolism; and even in this field to attempt only to emphasize the more important points, with the special purpose in view of giving the setting of the discovery of insulin in the development of our knowledge of the general physiology of metabolism.

The discovery of insulin has not come upon us like a bolt out of the blue, as did that of the Roentgen rays or radio-activity. It is not even the crowning gift of a long line of physiological research; it is on the contrary, to change the figure, merely a milestone in the advance of knowledge; and, if I mistake not, its greatest ultimate benefit to the race lies, not in the introduction of a new therapeutic agent, but in that it gives us a new starting point for future investigation of some of the most obscure but most important problems of the metabolism of living cells.

THE DISCOVERY OF THE RELATION OF THE PANCREAS TO CARBOHYDRATE METABOLISM.

The memory of men of my own age goes back to the days when diabetes was simply a name given to a disease syndrome, one feature of which was the presence of glycosuria. It was known that this glycosuria is not of renal origin; also that the glycogenic function of the liver is impaired. Obviously carbohydrate metabolism was deranged but in what way it was deranged was not known—indeed on this subject there was the greatest variety of conflicting and irreconcilable opinion.

Important steps had been taken, however, in unravelling the tangle. The distinction was clearly recognized between the alimentary glycosuria following a candy spree and the glycosuria of diabetes which persists at times despite the complete exclusions of carbohydrates from the diet. Hyperglycemia was generally held to be the cause of glycosuria in both cases, although the existing methods of blood sugar analysis still excused, if they did not justify skepticism on this point.

Claude Bernard had not only demonstrated the glycogenic function of the liver but had also shown that acupuncture of a certain region of the bulb resulted in discharge of glycogen from the liver and glycosuria. These and other facts had been established but their synthesis into a satisfactory picture of carbohydrate metabolism awaited new discoveries.

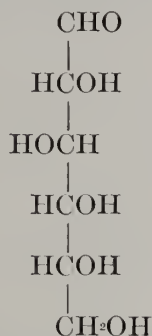
Diabetes was suspected to be primarily a disease of the liver, or of the tissues generally. No suspicion was prevalent that deficient pancreatic function had anything to do with the trouble. After some preliminary announcements,* von Mering and Minkowski in 1890 and Minkowski in 1893 gave to the world the full account of their well-known experiments, showing that extirpation of the pancreas led to a severe and fatal diabetic condition; and that this was not due to the withdrawal of the digestive action of the pancreatic juice, since, on the one hand, it does not follow ligation of the pancreatic ducts and, on the other, does not occur so long as a comparatively small remnant of the pancreas with no ducts connecting with the intestine is left, but immediately develops upon the removal of this remnant.

Von Mering and Minkowski's results were immediately fully confirmed and Hedon added the important experiment of first transplanting in the subcutaneous tissue a lobe of the gland absolutely separated even from connective tissue connection with the intestine, but

*Read as part of the symposium on The Pancreas, at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

*It shows how little the medical world of 1887-89 was prepared for this epoch-making discovery that the first announcement in the *Centralblatt f. Klin. Medizin*, 1889, x, p. 393 commands only a title reference with no abstract in the *Centralbl. f. Physiologie* for 1889.

A favored and fortunate few may have learned that the stereoisomeric structure is:



All this was quite true but it did not go far enough, for it left upon the mind the incorrect impression that glucose is always this hard and fast arrangement of carbon, hydrogen, and oxygen atoms, no matter whether in the solid form, or dissolved in water, or in the presence of weak acids or bases, or even in the living cells of the body.

We now know that when glucose goes into solution the atoms of its molecule undergo numerous reversible rearrangements and that the form which these rearrangements take depends on various physical and chemical conditions of the solution. The hard and fast glucose molecule of our student days existed chiefly in our minds; in nature and especially in living nature it is an extremely reactive molecule. If we could see the glucose molecules undergoing their changes of shape and structure in an aqueous solution, the solution would probably remind us of the old rain barrel teeming with mosquito larvae. We should see straight chains form ring compounds, first of one kind, then of another; we should see them react with water and dissociation take place into positive and negative ions; if some base is present, they would form salts, which in turn would dissociate with positive and negative electric charges on the opposite ions; rise of temperature would produce other changes with resulting possibilities of chemical synthesis or disintegration; most important of all, some of these isomeric forms are much more reactive to oxygen or other substances than other forms. Sugar is a food because it acts in this way as a labile molecule in the solvent of the body fluids, and it may be utilized only as it undergoes certain of these changes.

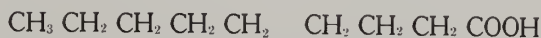
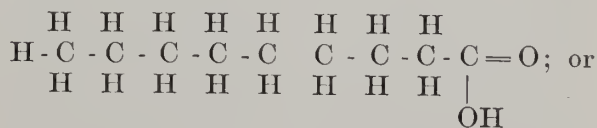
The most accomplished organic and physio-

logical chemists are just beginning to understand the behavior of a glucose molecule and to apply their knowledge to its metabolic performance. Enough is known to make us strongly suspect that, to take part in the oxidative changes which ultimately lead to carbon dioxide and water, the glucose molecule must first pass into one or more of these isomeric forms and possibly unite with other molecules—carbohydrate or protein—before the attack of oxygen or of other agents upon it is successful.

There can be little doubt that the active substance in our insulin extracts plays an essential role in this preparation of the glucose molecule for its metabolic activity. To the physiologist insulin settles the formerly disputed question whether the pancreas provides a material which—discharged into the blood, carried to the living cells, and absorbed by them—enables them to utilize sugar; or whether it exerts some sort of a “detoxicating” influence, removing from the blood some poison which prevents the utilization of sugar by the body. Insulin answers this question in favor of the first explanation just as thyroxin and the prophylactic and therapeutic administration of iodine in goitre answer a similar question in the physiology of the thyroid gland.

BETA-OXIDATION OF FATS AND FATTY ACIDS.

Biological chemists have also thrown much light on the oxidation of fats, or (what amounts to the same thing) the oxidation of fatty acids. A fatty acid molecule presents a chain of carbon atoms: e. g.,



Most of the food fats show a long chain: e. g.,

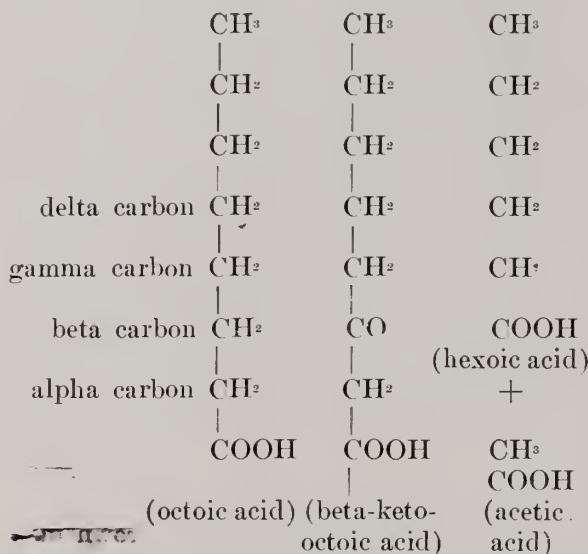
Palmitic acid: $\text{CH}_3. (\text{CH}_2)^{14}. \text{COOH}$

Stearic acid: $\text{CH}_3. (\text{CH}_2)^{16}. \text{COOH}$, etc:

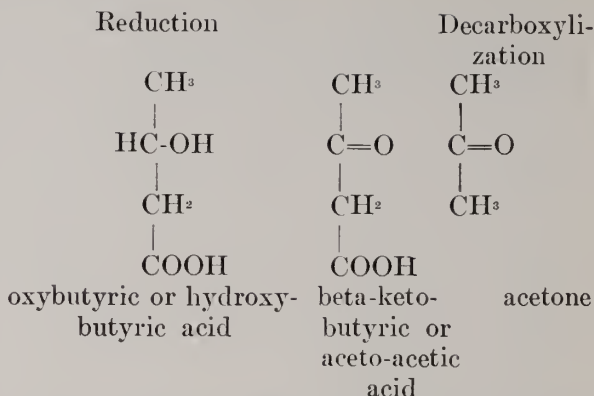
and one of the most striking things about the fatty acids of the *natural* fats, both of plants and of animals, (and this includes virtually all the food fats), is that they have an *even* number of carbon atoms. Fatty acids with an odd number of carbon atoms can be produced in the chemical laboratory, and several of the

amino-acids whose combination makes the protein molecule are substituted fats of an odd number of carbon atoms; but the natural fats are practically without exception esters of fatty acids of an even number of carbons.

This interesting "find" of the "pure scientist" has a most important bearing upon the occurrence of acetonuria and acidosis in all conditions (including diabetes) when sugar is not burned properly in the body. When oxygen attacks a fatty acid, it usually if not always unites with what we call the beta-carbon atom, i. e., the second carbon atom from the COOH, or carboxyl group, thus:



In the chemical laboratory oxygen may attack other carbons, and probably it may do so at times in the body; but generally it attacks the beta-carbon. The long carbon chain then breaks at the point of oxygen attack with the formation of acetic acid and an acid with two less carbons than the one we started with. The acetic acid is readily oxidized to carbon dioxide and water. The hexoic acid, in the above case, would next be attacked in the same manner on its beta-carbon, giving us the 4 carbon acid, namely butyric acid. This is likewise attacked, giving beta-keto-butyric acid (or aceto-acetic acid). We should expect this to break up into two molecules of acetic acid; but for some reason this last step is taken only in the presence of "active" glucose; i. e., that isomeric form of glucose which enters into the oxidative metabolism. Instead thereof in the diabetic body the aceto-acetic acid may undergo two changes, as follows:



It is for these reasons that these three compounds are associated in the urine of diabetics.

ACIDOSIS A CONCOMITANT OF KETONURIA.

The body, therefore, with impaired power of oxidizing sugar, is also unable to complete the oxidation of fats. Apparently it carries through the process of beta-oxidation quite successfully until the final stages are reached. Considerable energy is furnished the body in this process, but at the expense of the production and accumulation of enough of the relatively strong oxy-butyric and beta-keto-butyric (aceto-acetic) acids to draw too heavily on the alkali reserve and thus produce the condition of acidosis.

Insulin clears up both glycosuria and ketonuria (acetonuria) primarily by making it possible for sugar to burn and, in consequence of this burning, making it possible for these products of fat oxidation to "burn in the fire of the carbohydrates" just as they do in the normal body. The end products of this final normal step in the oxidation of fats, carbon dioxide and water, are promptly excreted, thus avoiding acidosis.

THE SUBSTITUTION OF ODD CARBON SYNTHETIC FAT FOR EVEN CARBON NATURAL FAT IN DIABETIC FEEDING.

Mention should be made in this connection of another promising attempt to facilitate the feeding of diabetics so as to avoid acidosis. If we could feed fats whose fatty acids contain an *odd* number of carbon atoms, beta-oxidation would occur; but this would bring us to the three-carbon acid, propionic acid, which is readily cared for by oxidation or by synthesis into sugar. We thus escape the pitfall of aceto-acetic acid. As already pointed out, the natural fatty acids of our fatty food all contain an even number of carbons. Chemists have pre-

pared the odd-carbon acids, but until recently only at prohibitive expense as a source of food. Recently Prof. R. H. McKee of Columbia University has succeeded in preparing on a commercial scale a fat whose fatty acid contains an odd number of carbon atoms. The cost of this fat at present is \$8.00—\$9.00 a pound; it is palatable and seems to serve in metabolism the same purpose as the naturally occurring fats. A manufacturing plant has been erected at Long Island City to make this product, known as Intarvin, for use in diabetic feeding.

When one remembers that the chief problem of diabetic feeding is to supply enough energy to the body after the usual chief source—the oxidation of glucose—is impaired or destroyed and, in consequence, fats cannot be used abundantly because of the danger of acidosis, the importance of having an odd carbon fatty acid in diabetic feeding is obvious.

THE PHYSIOLOGICAL SETTING OF INSULIN.

This paper makes no pretence of summarizing the literature of the physiology of insulin or of diabetes. This literature has accumulated with feverish rapidity during the past year. Fortunately, journals like the *Journal of the American Medical Association* keep the medical profession so well informed of progress that even "he who runs may read." I shall merely conclude with a brief glance at several points which will perhaps assist the general practitioner to get the physiological setting of these discoveries.

1. *What is insulin from the standpoint of chemical structure?* We recall the light thrown on adrenal function by Abel's demonstration of the structure of epinephrin and the light thrown on thyroid function and therapy by Kendall's demonstration of the structure of thyroxin, both these discoveries holding out the prospect of synthetic preparation of these internal secretions. Have we any similar knowledge of the chemical structure of insulin? We have not. We do not even know that it is a single compound. It is known to be destroyed by pepsin and trypsin (and hence cannot be administered *per os*) and this strongly suggests that it is a protein or peptide combination, or combinations, probably of considerable complexity. If this surmise should be confirmed, the prospect of synthetic preparation is not hopeful.

2. *Widespread occurrence of insulin-like substances in plants and animals.*—On the other hand, glucose is a food of all animals and of most plants. The green plant makes it with the aid of sunlight from carbon dioxide and water; the mold grows actively upon material containing it; the action of yeast on it is well known; and the occurrence of dextrose and glycogen is all but universal in the animal kingdom. If the mammalian body requires a special agent to make the glucose of its food available, we should expect to find it or some similar substance in plants and animals generally. This expectation is being realized in that Willaman has prepared from green plants and Collip from yeast an extract which lowers the blood sugar in diabetic animals. This suggests that insulin, or something performing the same general function as insulin, is widely distributed, a part of the mechanism, as it were, of most and possibly of all living organisms; and that in the higher animals this function has been segregated in the islet cells.

3. *Seat of action of insulin.*—Where does insulin act? In the blood, or in the cell?—for it would seem clear that it acts in the one or the other or both. Its addition to drawn blood has not, in the experiments made to test this point, increased the rate of disappearance of sugar (glycolysis) from the blood; on the other hand, it causes sugar to disappear much more rapidly from the fluid used in perfusing an isolated beating heart. These experiments strongly suggest that the seat of action of insulin is the cell itself, but they do not disprove the possibility that insulin may play its role in part or in whole in the blood. Glycolysis merely means that sugar has disappeared in the form which will give the reaction upon which the quantitative test is based. Its non-occurrence does not prove that the sugar has not been changed in internal structure, perhaps into a more reactive isomer, which still gives the reducing test; and it may be—for all the conclusive experimental evidence that I know to the contrary—that insulin acts upon the sugar in the blood, making it more reactive, and that this more reactive form of glucose enters the cell, there to be immediately oxidized.

4. *Regulation of the pancreatic manufacture and secretion of insulin.*—The extraction of insulin and the rough estimates we are al-

ready able to make of its amount in different organs, or in the same organ at different times, would also seem to give us a method of attacking the problem of the physiological adjustments of the pancreatic functions to the varying needs of carbohydrate metabolism in the organism as a whole. Virtually nothing is known on this subject today. Does the normal pancreas maintain a steady secretion of insulin into the blood or is its rate of manufacture or secretion or both adjusted to the existing needs of the organism? Here again we recall the history of adrenalin,—at first thought to be steadily secreted at a more or less uniform rate into the blood until shown to be under the control of the nervous system and secreted when occasion demands the more vigorous action of the reaction organs of the sympathetic fibers. With regard to this part of the physiology of the pancreas we are in the same stage of knowledge as we were with regard to the adrenals in 1895 and doubtless it will take long and careful investigation to answer the important physiological questions which crowd upon us. I merely desire to show you that the discovery of insulin gives us a new point of attack upon this field of physiology.

5. *The hypoglycemic reaction.* — To the physiologist and the student of metabolism probably the most important new revelation which has come to us as the result of the work with insulin is the hypoglycemic reaction consequent upon an overdose. So far as I know, this is a new discovery in the field of carbohydrate metabolism and a fact of deep significance, which demands immediate and intensive study. Going back to the days when Liebig dominated thought on metabolism, we recall his classification of foods into "plastic" and "respiratory," the former (proteins) providing material for tissue building and the energy for muscular work; the latter (fats and carbohydrates) serving no other function than the liberation of heat through oxidation. We recall the classical experiment of Fick and Wislicenus, which overthrew this theory of the (Czar of chemistry as effectively as Pasteur overthrew his theory of fermentation and showed that the oxidation of fats and carbohydrates yields energy for muscular work as well as heat to maintain the constant body temperature. Later it was shown that the energy for muscular work could come ultimately from protein or fat or carbohydrate;

but vestigial survivals of the old Liebig classification remain today in a very generally held point of view that the only function of fats and carbohydrates is to be burned either to do work or produce heat and it is largely immaterial whether fat or carbohydrate is used for this purpose. In other words, the fats and the carbohydrates play essentially the same role in metabolism.

Biochemistry has meanwhile accumulated facts which raise doubts as to the correctness of this point of view. For example, it is known that the cerebrins—a group of lipoid constituents of many cells—contain galactose in the molecule; also that the nucleic acids contain pentose or hexose radicles and that probably the hexose radicle is glucose. Obviously galactose and glucose are building stones of important chemical compounds. The development of lipoid chemistry has pointed to a similar function of fatty acid in the synthesis of other compounds.

Now comes the physiological and clinical observation that reduction of the blood sugar below a certain level is fatal; that, as this level is approached, certain important symptoms make their appearance, among them being a "rapid pulse rate (but a slow rate when the reaction is severe), pallor, sweating, stupor, peculiar feelings of impending danger, incoherence in speech, tremulousness, and finally coma and convulsions" (Seale Harris). Finally, all these symptoms are relieved promptly by increasing the blood sugar.

I can only make the wildest guesses at the physiological genesis of these symptoms; but I can see that they open up a new field of extensive investigation into many of the fundamental problems of metabolism. It would seem that the combination of insulin and odd-carbon fat in feeding normal and depancreatized animals gives us the means of studying the role of carbohydrates without the complication of ketonuria and acidosis. Hitherto, by the use of insulin, we could reduce the blood sugar to very low figures (0.03—0.04 per cent) but the picture of the effects of sugar deficiency in metabolism was blurred or completely obliterated by the resulting acidosis. It would seem that we should now be able to meet the energy needs of the body for comparatively long periods of time with odd-carbon fat and thus be in a position to see how metabolism in particular and the bodily functions in general are

influenced by deprivation of one of the usual foods. The combination of odd-carbon fat and phlorhizin poisoning holds out similar alluring prospects, which only actual research, and I doubt not an immense amount of most painstaking, critical research, can make our own; but it is one of the most important problems for immediate attack.

Physiologists have long suspected that the two sole sources of energy for muscular work may be glucose and fat. Protein food, it is true, may also serve as the ultimate source of energy for muscular work; but this may be only in virtue of the amino-acids of which it is composed and into which it is broken down in the alimentary canal; these amino-acids, after absorption into the body and deamination (removal of their ammonia radicle), give us sugar and fatty acids; and it may be that it is only this part of the protein molecule which serves as the source of energy for muscle work. Insulin may yet reveal to us the real chemistry of muscular contraction.

But these are more dreams of an enthusiastic physiologist, at least for the present. May I close this paper with a plea for the importance, the fundamental importance, the all-importance of pure science in the progress of medicine and the unstinted recognition of this in the form of public and professional support? It is certainly with no desire to detract one iota from the justly earned recognition of men like Banting, Macleod, Collip, and their co-workers that I remark that an almost painful lack of appreciation of true relative values is shown in the fact that the isolation of insulin and the working out of its therapeutic application has brought to the men who have done this work—and done it so well—far more public recognition than ever fell to the lot of von Mering and Minkowski, of Opie, of Graham Lusk, of Dakin, or even to that prince of pioneer investigators, Claude Bernard, who have made contributions of equal merit and some of greater importance to the physiology of carbohydrate metabolism but whose great discoveries did not at once find application in the practice of medicine. I do not begrudge the recognition which has come to Banting and Macleod. They richly deserve it. Nor do I find fault with the lack of popular recognition of the pure scientists whose work has helped to lay the foundations of our knowledge and our practice. This is inevitable in the

nature of the case. One hundred years from now all this will matter nothing whatever. I do insist, however, that the work of von Mering and Minkowski, of Lusk, and the rest is as important to us today as that of the Canadian investigators; and that without the former we should not only not have the latter, but we would not know what to do with insulin if it came to us as a gift by some sort of direct inspiration; and I insist upon this, not for a moment to plead for similar popular, personal recognition of the results of purely scientific investigation in the field of medicine—for this I do not “care a fig;”—I do it to emphasize the all important character of “pure science” in medicine and to urge that you do all in your power to increase public support of this work in our medical schools and research institutes. Every great advance in practice has come from the increase of insight, through patient, accurate, truth-seeking and generally long continued investigation into the pure science of the phenomena of living things with which we deal.

THE PATHOLOGY OF THE PANCREAS.*

By K. D. GRAVES, M. D., Roanoke, Va.

The pancreas is subject to a number of pathological changes, such as abscess, calculi in ducts, carcinoma, adenoma, sarcoma, inflammation, hemorrhage, syphilis and tuberculosis; but, owing to the limited scope of this symposium, I shall limit myself to a discussion of the changes which take place in it incident to the disease known as diabetes mellitus.

A great deal of work has been done, and many theories advanced as to the function and importance of the internal secretion of the pancreas. Mering and Minkowski in 1889 showed that extirpation of the entire pancreas led to the familiar train of symptoms of diabetes mellitus. Opie in 1900, and later Schaefer and Ssoblew, called attention to the islands of Langerhans in connection with diabetes, and maintained that the active portion of the pancreas in preventing diabetes was to be found in them; and MacCallum in 1909 and Kirkbride in 1912 performed a most interesting experiment which was as follows: Half the pancreas of a living animal was ligated, and the animal survived; a year later the animal

*Read as a part of the symposium on The Pancreas, at the fifty-fourth annual meeting of the Medical Society of Virginia, in Roanoke, October 16-19, 1923.

showed the transformation of the ligated portion into a thin transparent film in the mesentery. Extirpation of the normal half of the pancreas was followed by a transient glycosuria, from which the animal survived and recovered; but after the extirpation of the thin film which represented the other half of the pancreas, the animal developed severe diabetes; this film contained only islands of Langerhans.

Surprisingly few cases of diabetes have been found which show gross changes in the pancreas; but, as has been mentioned above, the majority show microscopic changes of one sort or another, either in the number of islands or their microscopic appearance. Weichselbaum and Heiberg emphasized the importance of the islands, the former the qualitative, and the latter the quantitative; Allen lays stress on hydropic degeneration as an end result, and fibrosis and chronic pancreatitis as evidence of functional impairment; Conroy considers that both quantitative and qualitative changes are operative, laying emphasis on hyalinization and fibrosis of the insular tissue. Cecil found pathological changes in the pancreas in 87% of his diabetic cases.

I have cited the above opinions and conclusions chiefly to show their divergence. It is, in the light of our present knowledge, manifestly impossible to say didactically by gross or microscopic examination, that a certain patient had diabetes; we may say that we find certain conditions which strongly suggest the disease, but here our report must end. If, after such exhaustive efforts as have been made to correlate the visible picture of the organ with diabetes, we must confess our inability definitely to diagnose the disease by a study of the pancreas, we must feel fairly safe in assuming that further light on the characteristic changes which take place in the pancreas will probably come, not through further microscopic study, but by some other avenue of approach, such as possibly a biochemical reaction, as we have with adrenalin; or a biophysical reaction, as we have with the electrocardiograph; or some other equally remote, but equally possible means of detecting deviation from normal.

In conclusion, may I reiterate that, although years of exhaustive study have been spent by the leaders in pathological thought, in their effort to correlate microscopic changes in the pancreas with symptoms of the disease in the

human organism, there is still a wide divergence of opinion, apparently indicating that they have not yet solved the problem; but that, with the momentous and epoch-making discovery of Banting and his associates, a new era has been ushered in, which promises hope to the diabetic patient, and encouragement to the student of the subject.

Lewis-Gale Hospital.

DIAGNOSIS AND MEDICAL ASPECTS OF DISEASES OF THE PANCREAS.*

By JAMES H. SMITH, M. D., Richmond, Va.

How can we recognize disease of the pancreas? What is the lesion? What are the broader indications as to treatment? These I conceive to be the questions embraced in my subject.

An anatomical and functional isolation of the isles of Langerhans tends to hold in disease as in the normal. When advanced stages have been reached in acinar or interacinar lesions, carbohydrate metabolism may be impaired—sometimes, indeed, early; but we do well not to rely upon these two parts of the gland for evidence incriminating each other. Disease affecting the external secretion will be first considered.

Because the external secretion splits fats, proteins and carbohydrates, diagnostic evidence may be furnished by failure of either of these classes of foods to be digested, or by a lessened content of the respective enzymes in the faeces. Steatorrhea is the name given to the passage of stools containing liquid fat, solidifying on cooling. While it points directly at the pancreas, its occurrence is rare. Significance almost as great is attached to the chemical determination of more than fifty per cent of fat unsplit. Lesser percentages may be due to other causes. The not uncommon clay or putty colored stool may be due to pancreatic deficiency, or, as the term "acholic" indicates, to biliary obstruction, or to some process such as peritoneal or mesenteric tuberculosis, which interferes with intestinal absorption.

The presence in the faeces of undigested striped muscle is indicative of pancreatic rather than hepatic disease. But it may result from any condition in which the intestinal contents pass rapidly through the bowel. It has been termed creatorrhea.

*Read as part of the symposium on The Pancreas, at the fifty-fourth annual meeting of the Medical Society of Virginia, at Roanoke, Va., October 16-19, 1923.

Failure of the starch-splitting ferment to reach the intestine is evidenced by a shortage of diastase in the faeces, and an excess in the blood and urine. The two latter are of value when the kidney function is not impaired. I will not quote the technical details of this and other special tests; I have had no experience with them except through pathologists. The Cammidge reaction has never come into general use, and its value is doubtful. There is a series of so-called "messenger" tests, consisting of passing various substances through the bowel to see what happens to them. Einhorn's method of obtaining duodenal contents for examination of its tryptic activity was a forerunner of Lyon's method for study of the biliary secretion. Beyond question, we need something that will furnish direct evidence of disease of the pancreas, but it can hardly be said that any one of these tests has, so far, proved uniformly reliable.

To return to the data to be had at the bedside; the typical stool in disease of the pancreas is bulky, pale, soft, gaseous, offensive, high in fat content, and may contain undigested muscle fibres. This will be recognized as quite the same description applying to the stools in sprue, though it does not constitute the diagnosis of sprue. Glandular insufficiency involving the pancreas, liver, intestinal glands, and often the stomach may develop in sprue or other wasting constitutional disease, such as pernicious anaemia or pellagra. The tongue is often a good index of such a deficiency. Ashford¹ claims that true tropical sprue results only when there is superimposed upon glandular insufficiency, colonization in the digestive tract of a specific organism, *monilia psilosis*. Others have attempted to treat sprue specifically with vaccines made from this organism.² Probably the etiology of sprue should be regarded as unsettled.

In conditions in which pancreatic secretion is deficient, beneficial effects have been reported from the administration of fresh pancreatic substance. Several careful investigators have testified to a potency of commercially prepared pancreatic extracts. Such products from reputable makers are useful remedies, and it is preferable to get a clean preparation from a drug store rather than something to be eaten raw from a butcher. Se-

lection should be made with a view to the ferment or ferments most needed. In a case of severe, prolonged secondary anaemia due to hemorrhoids, with stools of the character described, I attributed much benefit to pancreatic extracts. An American physician, returned from Korea, stated that sprue is common in that country, that he had treated many cases, and was convinced that he himself was suffering from that disease. He improved under pancreatic extract along with diet and the chance to recuperate from fatigue and worry in a difficult environment. Thomas Brown³ reports five cases of sprue in which he established the fact of pancreatic insufficiency. Four showed remarkable improvement from the administration of pancreatin, which is a preparation of trypsin. A large number of minor illnesses, and a symptom-group arising in various diseases, situations in which we often prescribe calomel, flatulent indigestion and the like may be contributed to by a pancreatic fault, as much as by biliary derangement. This is the state referred to by Garrod⁴, in which the pancreas is only "worried," rather than diseased. In my experience, pancreatic preparations are more effectual in relieving such complaints than are the bile salts. After all, the bile salts are adjuvant only to the pancreatic lipase.

The intimate relationships, both anatomical and functional, between the liver and the pancreas at times make differential diagnosis almost impossible. The pancreatic duct comes into direct relation with the common bile duct at the diverticulum of Vater, and the head of the pancreas lies in close apposition. Thus, the fat-splitting function of both secretions may be interfered with by a single calculus; progressive jaundice and enlarged gall-bladder—Courvoisier's law—are as characteristic of cancer of the head of the pancreas as of the bile-ducts; and inflammation traveling along the ducts may result in acute or chronic pancreatitis as a complication or sequel of bile-tract infection. Most of us keep pretty well in mind the liver as a source of abdominal trouble. Whenever we suspect the liver, we should consider the pancreas; roentgen-ray study may help to locate the lesion. As the same measures of treatment, chiefly surgical, are applied to both in the present state of our

1. Ashford, Bailey K., Am. Jour. Med. Sci., 165, 2, 157.
2. Rogers, J. M., Jour Am. Med. Assn., 79, 20, 1677.

3. Brown, Thomas R., Am. Jour. Med. Sci., CLXI, 501.
4. Garrod, Archibald E., The Lancet, Apr. 3, 1920.

knowledge, no very vital issues usually are at stake. As between drainage and removal of the gall-bladder, perhaps the pancreatitis at times associated with cholecystitis deserves special consideration. This, however, is a surgical question. When we think of these two extensive systems of ducts, and the organs to which they lead, it is not difficult to understand why gall-bladder operations often fail to give the permanent relief hoped for.

When the pancreas becomes the seat of acute hemorrhagic inflammation, the clinical picture most nearly approaches that of intestinal obstruction. Suppurative inflammation, necrosis or gangrene may follow. From obstruction, acute inflammation of the pancreas is distinguished by an even more sudden and overwhelming onset. The localization of pain is more apt to be epigastric, and the increased peristaltic action of the bowel when obstructed would not be expected. A perforated peptic ulcer would likewise come to mind, and here the history would be helpful. If the abdomen is opened, a characteristic fat necrosis may declare the pancreatic origin of the trouble, due to the digestive powers of the secretion.

Because of the location of the pancreas, tumors of this organ are usually to be found in the epigastrium or left hypochondrium. If a rounded mass presents itself in this area, a pancreatic cyst would be suggested. The pulsation transmitted to such a cyst by the abdominal aorta, suggesting aneurysm, may usually be eliminated by causing the patient to assume the knee-chest position.⁵ Roentgen-ray study of the stomach should exclude cancer of that organ.

Certain pathologists, notably Warthin, have endeavored to show that syphilitic pancreatitis is a frequent cause of diabetes mellitus. There is little corroborative evidence. Williams, Mitchell, Rosenbloom, Joslin and Lemann, have all presented data to the contrary. In seventy-eight cases of diabetes reviewed by the writer a year ago,⁶ syphilis had been recognized in three only. Clinical recognition of syphilis of the pancreas is hardly possible without evidence of a luetic affection elsewhere or a positive Wassermann reaction. Tuberculous pancreatitis likewise would require a more or less general background of tuberculosis for its recognition.

Briefly to review the diagnostic considerations up to this point, disease affecting the external secretion of the pancreas is to be inferred from disturbance of digestion with its attendant pain, discomfort, wasting and anaemia; from the gross and microscopic character of the stools; from a study of the enzymatic activity of the fæces, the tryptic activity of the duodenal contents, and the starch-splitting power of the blood and urine. These data suggest faulty pancreatic function. Naturally they are more pronounced in the conditions resulting in obstruction of the pancreatic duct—calculi, cancer and cysts. Jaundice, the outward sign of a deranged liver, is also the only color in which the pancreas with its colorless secretion can signal its distress. Acute hemorrhagic pancreatitis gives the picture of an upper abdominal catastrophe of the gravest kind. In a pancreatic cyst, the tumor would have the common physical characteristics of a cyst, would usually tend toward the left of the upper abdomen, and often transmits pulsations from the abdominal aorta. If, now, carbohydrate metabolism is impaired, as shown by glycosuria or abnormally high blood sugar under normal dietetic conditions, any suspicions held as to a parenchymatous lesion of the pancreas are strengthened. Carbohydrate tolerance tests, experimentally conducted, are as yet having widely different interpretations put upon them. Some would assign them value in the study of thyroid function, and others plot a blood sugar curve for cancer anywhere from the tongue to the anus.

It is seen, then, that the pancreas, as regards its external secretion, is still a subject that lies tucked away behind the stomach, duodenum and the liver, both in the patient's abdomen and in the purview of the diagnostician. That we know more about a fractional part of the gland, the Islands of Langerhans, than we do about the major part, is due to the highly specialized function of the former. Until very recently, there was a question in the minds of some, whether diabetes mellitus was essentially a disease of the internal secretion of the pancreas. That may be considered as settled, and this weird and fascinating subject has become one of the things of which we may speak with comparative confidence. Endocrinology has got itself labeled as a pseudoscience and the nest of theorists. The enthusi-

5. Opie, Osler's Modern Medicine, 2nd Ed., 111, 647.

6. Smith, James H., Va. Med. Monthly, February, 1923.

asm of its followers may lead them often to venture into the speculative, but solid achievement in the realm of the thyroid and pancreas, to mention none other, may well account for their faith and hope.

The diagnosis of frank diabetes mellitus is familiar to every medical student. Sugar in the urine should be regarded as due to diabetes until proved otherwise. Unless urinary sugar can be shown to be some form other than dextrose, potential or early diabetes is a safer working diagnosis than alimentary glycosuria. Carbohydrate tolerance tests are useful but, after all, the best test is a knowledge of the way the patient metabolizes a normal average diet. Renal diabetes is a rather rare condition in which the blood sugar remains normal on an average diet, though sugar appears in the urine. A low renal threshold for sugar is inferred. The symptoms of diabetes mellitus are lacking and it should not be treated as such. Diabetes insipidus is not a disease of carbohydrate metabolism. Loewi's phenomenon, the pupil dilating under the influence of adrenalin, seems to apply about equally well to exophthalmic goiter, diabetes and grosser pancreatic lesions (Garrod). It is an interesting observation, doubtless indicative of a relation between these conditions through the sympathetic nervous system, but it can hardly be considered necessary or valuable in the diagnosis of diabetes.

A discussion of the treatment of diabetes and its complications would carry us far beyond the limits of this paper. As it was a hundred years ago, so now, the treatment is primarily dietetic. Until 1922 the problem was to find out the patient's tolerance, to induce him to live within it, and to teach him how to do it. With the introduction of insulin, the situation has changed. A great tactical advantage is won, but the strategic principles are not altered. Insulin does one specific thing: given hypodermically or intravenously, it metabolizes sugar. We have no ground, as yet, to believe that the pancreatic lesion is healed, nor is it certain how far carbohydrate tolerance can be restored. In other words, it is substitution therapy, not a cure. The diabetic is not enabled to return to a normal diet; but his own inadequate tolerance can be added to in grams by the use of insulin, unit by unit, till the diet is brought to a rea-

sonable and comfortable level. Acidosis is controlled even, sometimes, when the patient is in coma. The dangers of hypoglycemia are not great if intelligent care is used.

To my mind this one achievement of honest medical effort offsets all the offenses of a generation of quacks. The foundation was laid by years of work by faithful scientists from von Merring to Allen. To few has it been given to serve their country in war and their fellowmen in the ways of peace, in the measure that has come to Banting, the youthful Canadian.

It now remains for the public health authorities, hospitals and philanthropic individuals to provide adequate clinics for these sufferers. This necessity does not arise out of any enormous cost of insulin, reports to the contrary notwithstanding. The factors involved are unique. The disease is chronic, requiring, under the best conditions, about a month of close observation of the patient, preferably in a hospital. This in itself, is no great stumbling block. It has been overcome with reference to tuberculosis, insanity, orthopedic and other diseases. Diabetes, however, is exceptional in that its management demands unusually close co-operation between three separate hospital departments—the ward, the laboratory and the diet kitchen. Above all, and surpassing the requirements in any other disease, there is the need to educate the patient in food values. People of all grades of intelligence and all sorts of home conditions, must be dealt with. The painstaking, conscientious efforts of a competent teacher are here essential. Usually a specially trained nurse or dietitian is best suited to the job. Manual training has been introduced into our public schools to provide our youth with a trade. Educational diabetic clinics must be organized in our hospitals to restore to economic efficiency and to save the lives of those who cannot follow the trade they have learned.

THE SURGERY OF THE PANCREAS.*

By ARTHUR D. OWNBEY, M. D., Newport News, Va.
Associate Surgeon, Elizabeth Buxton Hospital.

The pancreas is situated behind the peritoneum and lies across the posterior abdominal

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Dr. Ownbey substituted for Dr. J. T. Buxton, the original appointee, who was prevented by illness from taking part in the symposium.

wall at the level of the first and second lumbar vertebrae. It is five to six inches in length, one and one-half inches in breadth, and from one-half to one inch in thickness. The broad right extremity or head rests in the hollow of the duodenal curve. The body lies behind the stomach, and the tapered extremity or tail comes into contact with the spleen, and has the left kidney lying behind it.

The pancreatic duct or the canal of Wirsung is the principal excretory duct of the pancreas and extends through the substance of the gland from left to right. Commencing small by the junction of the little ducts of the lobules situated in the tail of the pancreas, it gradually grows in size as it constantly receives the ducts of the lobules composing the gland. Upon reaching the neck the duct turns obliquely downward, backward, and to the right. It comes into relation with the common bile duct, lying to its left side. After leaving the head of the gland it passes very obliquely through the mucous and muscular coats of the duodenum, and usually terminates by an orifice common to it and the common bile duct upon the summit of an elevated papilla, situated at the inner side of the descending portion of the duodenum, three or four inches below the pylorus. Occasionally the common bile duct and the pancreatic duct open separately into the duodenum. The duct of Santorini is frequently seen as an accessory duct of the canal of Wirsung given off in the neck of the gland. It passes horizontally to the right and opens into the duodenum about an inch above the orifice of the main duct. The pancreas resembles the salivary glands in that each lobule consists of one of the ultimate ramifications of the main duct, terminating in a number of cecal pouches or alveoli which are almost completely filled with the secreting cells, so that the lumen is barely visible. In certain parts, chiefly in the tail, there are found in the connective tissue among the gland tubules and alveoli, collections of cells, known as the islands of Langerhans, being named after the author who first described them in 1869.

The pancreas has two chief functions, that of an organ of internal secretion and of external secretion. The islands of Langerhans furnish the internal secretion and are not connected in any way with the duct system of the pancreas. The internal secretion controls the assimilation of sugars and a lack of this secre-

tion produces the well-known condition of diabetes mellitus. The external secretion is the most active and most important of all the digestive juices.

Diseases of the pancreas may be divided as follows:

1. Solid tumors:
 - Cancer
 - Sarcoma
2. Fluid tumors:
 - True cysts
 - a. Retention cysts
 - b. Proliferative cysts
 - c. Congenital cysts
 - Pseudocysts
 - Hydatid cysts
3. Pancreatic lithiasis.
4. Wounds of the pancreas.
5. Pancreatitis (as classified by Mayo Robson):
 - Acute
 - a. Hemorrhagic
 - {

- a. Ultra-acute, in which the hemorrhage precedes the inflammation, the bleeding being profuse and both within and outside the gland.
 - b. Acute, in which inflammation precedes the hemorrhage, which is less profuse and is distributed in patches throughout the gland.
 - b. Gangrenous
 - c. Suppurative (diffuse)
 - Subacute
 - a. Abscess of the pancreas
 - Chronic. Interstitial
 - a. interlobular
 - b. interacinar

CARCINOMA OF THE PANCREAS

Carcinoma is the most common neoplasm of the pancreas and, while it may be primary, it is usually not, being more frequently secondary to lesions of the stomach, duodenum, gall-bladder and bile ducts. When primary it involves the head of the gland in most all cases. Patients suffering with cancer of the pancreas are usually past middle age of life and give a history of vague digestive disturbances, accompanied by general weakness and rather rapid emaciation. Obstruction of the bile ducts may occur with a resulting jaundice which develops gradually, painlessly, and never lessens in its intensity. Should the lesion extend backward so as to involve the vena cava and portal vein, ascites will develop. Should the islands of Langerhans be involved to a very great extent there will develop a glycosuria. The association of chronic jaundice with distention of the gall-bladder is generally considered as an almost pathognomonic sign of cancer of the head of the pancreas (law of

Courvoisier). Surgical treatment in cancer of the pancreas carries with it an almost prohibitive mortality. It is doubtful if even an exploratory operation is justifiable if one is reasonably certain that the condition being dealt with is cancer. However, in some instances much relief has been obtained by an anastomosis being made between the gall-bladder and a convenient portion of the intestinal tract. This will afford a somewhat satisfactory drainage of the bile with a lessening and perhaps complete relief from the itching and ill-feeling produced by a deep jaundice.

SARCOMA OF THE PANCREAS

Sarcoma of the pancreas is found infrequently as a primary growth and only very occasionally is it observed as a secondary growth. A few cases have been reported where a sarcoma has been removed with gratifying results.

CYSTS OF THE PANCREAS

Cysts of the pancreas may be classified as true pancreatic cysts, pseudocysts and hydatid cysts.

Among the true cysts we have (1) retention cysts, due to the obstruction of the outflow of the pancreatic secretion, with the resulting dilatation of the ducts of the acini; (2) proliferative cysts or cystic neoplasm. These are cystic tumors, due to spontaneous proliferation of the epithelial elements of the gland, with accumulation of the fluid in the cavities which are so formed. They may be simple such as cyst-adenomata; or malignant, cystic epitheliomata or carcinomata; (3) congenital cystic disease of the pancreas which is exceedingly rare. Pseudocysts constitute a large porportion of cases reported as pancreatic cysts. While they may be found within the substance of the pancreas, the greatest number of pseudocysts are formed in contact with the gland, particularly in the lesser peritoneal cavity, usually as a result of some traumatic injury to the pancreas in which there has resulted some hemorrhage in or around the pancreas.

In the early stages the symptoms of cysts of the pancreas are vague. Pain in the epigastrium or just above the umbilicus may be present and may occur even when the cyst is not palpable. Epigastric distress with a feeling of fullness and vomiting may be the chief complaints. Should there be adhesions to the stomach, certain gastric disturbances will probably be present. Emaciation and weakness

have often been recorded and in not a few cases will be very striking. In some instances pressure symptoms may be observed, pressure on the portal vein producing ascites and compression of the vena cava causing edema of the legs. Nothing is found upon physical examination unless the tumor mass be large enough to palpate, in which instance, fluctuation can usually be made out though at times the sac is so tense that it appears to be a solid growth. The tumor is situated in the epigastrium and may be to the right or left of the median line. Cysts of the pancreas are usually most difficult to diagnose.

Cysts of the pancreas are amenable to surgical treatment and may be treated in one of the following ways: (1) aspiration; (2) evacuation and drainage; (3) extirpation, partial or complete.

Aspiration was used in some of the earlier cases but has now been abandoned.

Evacuation and drainage is the operation most generally applicable.

The abdomen may be opened on one or the other side of the median line above the umbilicus. The cyst is exposed by dividing its peritoneal coverings which vary according as to whether the cyst is above or below the stomach. Usually it is most easily reached by going through the greater omentum just below the stomach. Upon exposing the cyst it should be well walled off by means of gauze sponges to minimize the possibility of the contents of the cyst, which are very irritating, coming into contact with the intestines and abdominal viscera. The greater part of the contents may be withdrawn by introducing a large aspirating needle into the sac. The puncture is enlarged and the cavity temporarily packed with gauze to soak up the remaining fluid, while the edges of the opening are sutured to the parietal peritoneum. One or more drainage tubes are then introduced and are gradually removed as the cavity obliterates itself. In some instances fistulae through which pancreatic juice discharges may remain for months after this operation.

Extirpation is applicable only in those cases where the pedicle is small and there are few or no adhesions. However, should the cyst appear malignant in character, a serious effort should be made to remove it. Malignancy is indicated when little intra-cystic growths can be felt.

PANCREATIC LITHIASIS

Pancreatic lithiasis is a condition that is not often found but is probably more commonly present than is suspected. The stones are usually found lodged in the ducts though there may be cases in which they are found in a cystic diverticulum. The smaller stones may be expelled into the intestines without any symptoms. They are composed chiefly of the carbonate or phosphate of lime and possibly some cholesterin. They are usually irregular in shape, firm and white or grayish-white in color.

There may or may not be any symptoms of stones in the pancreas. Pain which is generally localized in the epigastrium is the most common symptom and may be slight or severe and paroxysmal. Nausea and vomiting often accompany the attacks. Jaundice is only occasionally seen and is most often due to gall-stones occurring simultaneously though it has been produced by a large pancreatic stone pressing upon the common bile duct sufficiently to produce obstruction to the flow of bile. Chills and fever may occur according to the amount of infection present. Glycosuria is a late manifestation of the disease and is present only after an involvement of the islets by an intra-lobular pancreatitis. Alimentary glycosuria is a significant and frequent finding. Most pancreatic calculi are discovered accidentally while operating for some other upper abdominal condition.

The treatment is surgical and consists of the removal of the stones. The situation of the calculi determines the method of procedure. Stones in the ampulla of Vater or in the right extremity of the duct of Wirsung may be removed by opening the duodenum and incising or stretching the papilla common to bile and pancreatic ducts, so that forceps or a probe may be introduced into the duct of Wirsung. Should the calculi be situated some distance from the papilla, it will be necessary to expose the pancreas through the gastro-hepatic omentum or through the transverse mesocolon. The gland is incised over the stone, the stone removed and the incision closed by deep sutures of catgut. In some instances the stone can be more easily reached by severing the reflection of peritoneum from the duodenum to the abdominal wall and retracting the duodenum anteriorly and to the left. Whenever the gland

has been cut, it is safest to insert a cigarette drain down to site of incision.

WOUNDS OF THE PANCREAS

The pancreas is very infrequently wounded because of its depth within the abdomen, its protection by other viscera and the partial shelter afforded by the costal arch.

Gunshot and stab wounds constitute the most frequent injuries and next to these are such injuries as would result from a violent blow upon the epigastrium, as by the kick of a horse or from being crushed, such as would occur when a heavy vehicle passes over the body.

The pancreas is practically never injured unless there occur simultaneous wounds of some other abdominal viscus and symptoms of injury to the pancreas are usually masked by the symptoms of the lesions of other organs such as the liver, stomach or spleen.

In any case where there is a stab or gunshot wound or severe contusion of the abdomen with evident signs of intra-abdominal injury, it is not so important that a diagnosis be made before operation but that an exploratory operation be done and it is imperative that the pancreas receive a thorough inspection. The chief dangers from injury to the pancreas are hemorrhage, infection and fat necrosis. In favorable cases of punctured or incised wounds, the torn edges may be brought accurately together by strong catgut sutures, passing through the capsule and parenchyma, care being taken to avoid catching up the duct of Wirsung. If there has been much hemorrhage, it must be thoroughly controlled and provision made for drainage. Fat necrosis necessitates the free drainage of the secretion and probably leaving the wound open with tamponing of the abdominal cavity. In all operations on the pancreas one should be careful to produce as little trauma as possible.

PANCREATITIS

Of the two chief forms of pancreatitis, catarrhal and parenchymatous, the latter is the more frequent and the most common.

There are three principal theories to explain the cause of pancreatitis but as yet the cause and the way in which it works is still somewhat unclear. The first theory is that pancreatitis is produced by the effect of bile entering the duct, or by reason of an obstruction due to a stone or mucus or by a spasm of the duct sphincter at the outlet of the common duct.

The second is that duodenal contents are forced into the common duct at a time when it is temporarily relaxed and thence into the pancreatic duct. The third explains it by a lymph-borne infection from the gall-bladder, bile ducts and duodenum. And then there are those who believe that the infection may be hematogenous in origin.

As regards the obstruction of the flow of the bile through the sphincter, two explanations have been offered. In the first place, as can be easily understood, it is possible for a stone to block the ampulla of Vater in such a way as to make the common bile duct and the pancreatic duct into one. Second, it is believed that acid in the duodenum will produce a spasm of the sphincter and this theory is borne out clinically by the fact that chronic pancreatitis is often present in patients with ulcer of the duodenum and in alcoholics. In these persons it is thought that the acid injected into the duodenum remains longer before it is neutralized than in normal individuals.

It has been shown experimentally that normal bile introduced into the ducts of the pancreas produces inflammation and necrosis of the parenchyma with which it comes into contact. Others claim that, when normal bile enters the pancreas, no particular harm is done. However, when infected bile enters the pancreas, there occurs extensive and massive destruction with edema, congestion, hemorrhage and an inflammatory response on the part of the fixed connective tissue.

It has been shown experimentally that mucin modifies the irritant action of bile and, therefore, any condition such as an obstruction of the cystic duct by a stone, which would tend to lessen the normal amount of mucin, furnished by the wall of the gall-bladder, would render the occurrence of pancreatitis more likely.

According to Deaver, infection carried by way of the lymphatics plays the most important role and supports his view by the statement that in most instances chronic pancreatitis is associated with the inflammation of some abdominal viscus and that the most often diseased part of the gland—the head (the part furthest removed from the duct)—is that which has a free lymphatic relationship with the affected viscus. He has designated that part of the head of the pancreas which is most often found diseased as the triangle of infec-

tion, that is, the area between the ducts of Wirsung and Santorini.

As to the pancreatitis being produced by the entrance of the duodenal contents into the pancreatic duct, it may be said that this is a possibility that seldom occurs. It has never been proven by animal experimentation but the possibility is evident by the fact that in a few instances post mortem dissection has shown the pancreatic duct opening directly into the lumen of the intestine and, in one or two cases, a localized pancreatitis has been demonstrated around the duct of Santorini.

According to the conclusions drawn by Mann and Giordano from their experimental work, we must look elsewhere for the explanation of the cause of most cases of pancreatitis than the passing of bile into the pancreatic duct, but to the greater number of clinicians and surgeons the most plausible explanation for the cause of pancreatitis is the one attributing the condition to a reflux of bile into the pancreatic duct.

ACUTE PANCREATITIS

In this paper the term acute pancreatitis covers the acute hemorrhagic, acute gangrenous, and acute suppurative forms, since they are all phases of the same condition and are not distinct pathological entities, though as a rule the latter two follow the first named condition.

As to the relation between hemorrhage into the pancreas in acute pancreatitis and inflammation there has been considerable controversy. There are those who hold that hemorrhage occurs altogether apart from inflammation, not caused by it, not causing it; that such hemorrhage may be fatal and at post mortem examination not the smallest trace of an inflammatory process found. This condition is known as "pancreatic apoplexy." There are others who hold that an acute inflammation is the primary factor and the hemorrhage, slight or severe, is secondary. And still there are others who contend that the hemorrhage occurs first and is followed speedily by an acute inflammatory outbreak.

SYMPTOMS—ACUTE

The patients are usually of middle age and obese. The onset is sudden with intense pain in upper abdomen. The severity of the pain is the most significant thing. The location of the pain is most often in the epigastrium and may be on the left but is more commonly felt

on the right of the midline near the gall-bladder region. However, the location is so variable that it is of little importance. Vomiting occurs and is repeated again and again without bringing relief. The skin is pale and moist, the pulse rapid and of poor quality, temperature normal or subnormal. There may be cyanosis, shallow breathing and dyspnea. Tenderness is usually marked, not localized, but extends across the epigastrium. Distinct rigidity of the muscles is rare though some resistance may be felt on deep palpation. Should the patient survive the acute onset for twenty-four to forty-eight hours, the hyperacute symptoms will subside and in two or three days signs of acute upper abdominal peritonitis may appear. Suppuration is characterized by fever, chills, weakness, emaciation, high leucocyte count, marked tenderness and rigidity. Acute pancreatitis must be differentiated chiefly from perforation of a duodenal or gastric ulcer and gall-stone and kidney stone colic. However, the pain in acute pancreatitis is much more severe than in other of conditions named. Exercise increases the pain of acute pancreatitis and this fact tends to differentiate it from kidney colic. Constipation is marked as the result of a toxic ileus, and the condition is often mistaken for intestinal obstruction but vomiting lessens in acute pancreatitis while in obstruction it is usually progressive. William Linder states that tenderness in the left costo-vertebral angle is of extreme diagnostic importance and invariably means involvement of the tail of the pancreas. In all cases of suspected acute biliary disease an associated pancreatitis should be considered.

Treatment consists in immediate operation. The earlier the operation, the greater the chance of recovery, although we now know that mild cases often get well spontaneously. It is not advisable to delay operation hoping that the signs of shock may lessen. The collapse is due to absorption of toxic products of the pancreatic necrosis and delay will allow a steady increase, lessening chance of recovery. A longitudinal incision of sufficient length is made through the middle or to the inner side of the right rectus to give a good exposure of the pancreas. There are three routes by which the pancreas may be exposed and the omental bursa opened: (1) above the stomach, through the gastro-hepatic omentum; (2) below the stomach, through the upper part of the gastro-

colic omentum; (3) through the transverse mesocolon. The second route is the usual method of approach. Should there be marked necrosis and hemorrhage, more than one route may be opened and gauze drains inserted in order to drain thoroughly and prevent the spread and absorption of the toxic products. Upon opening the peritoneum a blood stained fluid or a peculiar odorless beef-broil fluid may escape and the pancreas is found to be greatly swollen, dark in color and engorged in blood. Yellowish white spots of fat necrosis may be seen in the mesentery or the omentum or the pancreas. It should be punctured lightly in several places and free drainage afforded. This is accomplished by means of pieces of rubber dam tucked into the slits in the pancreas and also gauze which are brought out together through the original wound or through a posterior stab wound in the left loin, or even in both directions. The gall-bladder and bile ducts are rapidly inspected and, if the patient's condition be satisfactory, such treatment of them adopted as seems proper. However, in the severe cases it will be better to establish free drainage as quickly as possible and leave the biliary tract pathology for a later operation.

SUBACUTE

Subacute pancreatitis is similar to acute pancreatitis except to a slighter degree. In this condition we have single or multiple abscesses of varying sizes in or around the pancreas which have formed usually following an acute pancreatitis. The condition may begin with the sudden onset of pain, acute, but not overwhelming, in the epigastrium. Vomiting often occurs but faintness and collapse are not so marked. The pulse is not so rapid and the patient does not look so ill. Instead of hastening to his end he lingers on and in a few days, as an abscess begins to form and enlarge, the temperature rises, often reaching 103° to 104°, and there may be a succession of rigors. The loss of flesh and strength is most striking. Epigastric tenderness is rather marked and in some instances a swelling may be made out.

The subacute variety is much more amenable to surgical treatment than the acute. Upon opening the peritoneal cavity, fat necrosis is usually observed and is a pathognomonic sign of the condition you are dealing with. Drainage here is the chief factor in the treatment.

The abscess may be evacuated through the

anterior abdominal wall or through incision in the lumbar region as has been described under treatment of acute pancreatitis.

CHRONIC PANCREATITIS

Chronic pancreatitis is of the two forms: (1) chronic interlobular pancreatitis, characterized by an overgrowth of connective tissue between the lobules; (2) chronic interacinar pancreatitis with an atrophy of the acini and a growth of connective tissue between the acini with slight involvement of the interlobular septa. In the latter type the islands of Langerhans are often degenerated and sclerosed.

The chief symptoms of chronic pancreatitis are emaciation; cretorrhea; steatorrhea; glycosuria and pain which is present in half or less than half of the cases and, when it does occur, is difficult or impossible to distinguish from that of duodenal ulcer or gall-stone. The pain is deep seated and radiates posteriorly into the left shoulder. Should colic be present, it is usually due to calculi. Occasionally some resistance is felt in the epigastrium which does not move with respiration thus differentiating it from tumors of the stomach. However, an enlargement sufficient to be palpable is rare.

The diagnosis of chronic pancreatitis by the surgeon at operation is open to criticism because he bases it upon the palpation of an enlarged and hard pancreas. A hard pancreas is not necessarily a diseased pancreas and no organ varies more in size than the pancreas. It is also extremely difficult to differentiate chronic pancreatitis from cancer of the pancreas. Deaver thinks it can practically never be done.

Since chronic pancreatitis is most often associated with diseases of the biliary tract, the best results from surgical treatment will come by the proper management of the pathology of the biliary tract encountered at operation. Drainage of the bile is the most important thing and may be effected in one of three ways: (1) choledocotomy; (2) cholecysenterostomy; (3) cholecystostomy. Robson and Moynihan believe that tube drainage direct to the skin is much more efficient and satisfactory. It is best to keep the external fistula open until the bile appears healthy, which requires from a few weeks to more than a year. The close etiologic relationship of pancreatitis and dis-

eases of the adjacent viscera should always be borne in mind when operating in the upper abdomen and the proper handling of a beginning cholecystitis or bile tract infection will prevent most of the cases of pancreatitis. Medical men should be aware of this fact and not hold cases of bile tract infection under medical treatment too long before referring the patient to a surgeon.

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THE ETIOLOGY AND PREVENTION OF DIABETES.*

By SEALE HARRIS, M. D., Birmingham, Ala.

Diabetes is essentially a deficiency of the secretion of insulin by the Islands of Langerhans in the pancreas. According to modern nomenclature the word "hypoinsulinism" would better describe the condition characterized by an excess of sugar in the blood than does diabetes mellitus, which the ancients gave it because of the presence of sugar in the urine. Hypoinsulinism is also a better name for the condition than glycosuria because the latter condition may be transient and result from the use of phlorizin, or adrenalin, and it also may be a sequence of emotional disturbances and a condition of the kidneys known as low renal threshold, in which there is no deficiency in the secretion of insulin and a normal amount of sugar in the blood.

HYPERINSULINISM.

From recent observations, I am convinced that there is a definite syndrome, perhaps a distinct disease entity, which should be called hyperinsulinism, the symptoms of which are those as described as resulting from hypoglycemia. While not strictly relevant to the subject assigned me, I mention this in order for it to be a matter of record when published, because I have seen no mention of it in medical literature. Every physician who has had much experience in treating digestive diseases sees patients who, when their stomachs are empty, complain of extreme hunger, weakness, nervousness, tremulousness, sometimes dyspnoea, subnormal temperature and low blood pressure. We have examined the blood sugar in two such patients at the time when they were having the symptoms described above and their blood sugars were .065 and .070, respectively. The symptoms disappear after eating or after taking a soft drink. In one of these cases the blood sugar went up to .130 after a meal of high carbohydrate content. It is possible that hyperinsulinism may precede hypoinsulinism as hyperthyroidism is sometimes followed by hypothyroidism. We are beginning some observations (which we hope to publish in a few months) on patients who have nervous symptoms associated with hunger that we believe to be the result of hyperinsulinism.

PANCREATITIS PRECEDES DIABETES.

But to get back to the discussion of the etiology of diabetes, anything that can inhibit or destroy the function of the insulin-producing cells may cause the disease. It is therefore obvious that the causes of diabetes, like the sins of men, are many. It seems probable, however, that the most important underlying factor in the production of diabetes is a preceding, or a concurrent, pancreatitis; and in discussing the etiology of diabetes, the causes for infection of the pancreas should receive prime consideration.

The theory that a damaged pancreas precedes hyperglycemia does not in the least disprove the theory that over-eating or improper eating is a predisposing or an exciting cause of diabetes. In the first place, a crippled pancreas may be able to metabolize the glucose producing foods in the normal diet, but would fail to take care of the carbohydrate in the debauches of the gourmand; secondly, the point that I desire to stress particularly is, that pancreatitis is often the result of the vitamin deficiency in a diet in which there may be an excess of proteins, carbohydrates and fats.

SOURCES OF INFECTION IN PANCREATITIS.

Since a pancreatitis resulting in permanent damage to the pancreas is the most important predisposing cause of diabetes, it is necessary to consider the sources of the original infection in pancreatic inflammations.

On account of its protected position, primary infection of the pancreas must be rare. Trauma of the pancreas, however, associated with other internal injuries, does occur. We recently have had two cases of severe diabetes which developed so soon after railway accidents that there can be but little doubt that the internal injury involving the pancreas was the direct cause of the glycosuria. These cases were reported at the recent meeting of the American Medical Association.*

Secondary infection of the pancreas may take place in a number of ways but, on account of its anatomical relations, its blood supply and its lymphatic connections, it would seem that the most frequent sources of infection come from lesions in the gall-bladder, stomach, duodenum, and other portions of the small intestines and the colon. Indeed, when the

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anatomical relations and the collateral circulation of the pancreas are considered, it is difficult to understand how it escapes infection, when there is an inflammatory lesion of any viscus in the abdomen or of any part of the peritoneal cavity.

THE ROLE OF GALL-BLADDER INFECTIONS.

Infections of the gall-bladder would seem to be, and often are associated with a pancreatitis. The opening of the common bile duct in the duodenum is very close to the openings of the ducts of Wirsung and Santorini, when the latter does not empty into the main duct. The common bile duct is always in contact with, and often embedded in, the head of the pancreas; therefore it would seem that, both by continuity and contiguity of structure, a cholangitis or a cholecystitis would be associated frequently with an inflammation of the pancreatic duct, (sialo-angitis and sialodochitis) and a generalized pancreatitis.

The fact that surgeons, in operating for gall-bladder disease, so frequently find an enlarged and inflamed pancreas, which subsides with the removal of the gall-bladder infection by drainage, seems to favor the theory that pancreatitis is often secondary to gall-bladder disease. I have observed several such cases, in two of which the surgeons, after opening the abdomen, made the erroneous diagnosis of cancer, because of the enlarged hard pancreas with extensive adhesions to surrounding structures. In both cases, drainage of the gall-bladder gave relief of symptoms, with restoration to health and no evidence of pancreatic disease over a period of two and four years.

A number of cases have been reported of glycosuria patients whose urine became sugar free after gall-bladder drainage. We have had one such case; therefore, it would seem advisable to suspect gall-bladder infections in diabetes and, if such exist, a gall-bladder drainage may cure the pancreatitis and at the same time remove the primary or associated lesion. In gall-bladder infections associated with diabetes, or with known pancreatic lesions, drainage would seem to be indicated rather than a cholecystectomy. I would not be understood as advising an operation as a cure for diabetes but, in cases in which there is known gall-bladder disease, it seems likely that there is associated an active pancreatitis and the operation for the gall-bladder condition, which

may be the focus of infection for the pancreatitis, may save the pancreas from further damage, and in that way be helpful to the diabetic.

STOMACH AND INTESTINAL INFECTIONS.

Since the pancreatic duct, or ducts, open in the descending portion of the duodenum, and the head of the pancreas is almost entirely surrounded by the coil of the duodenum, it would seem that a duodenitis, which we know to be a frequent condition, may be followed by pancreatic disease. Ulcers of the duodenum may result in adhesions to the pancreas with subsequent pancreatitis. The jejunum is also in relation to the inferior surface of the body of the pancreas.

The concavity of the lesser curvature of the stomach corresponds approximately to the convexity of the anterior surface of the pancreas; and ulcer and carcinoma of the stomach result in adhesions to, and secondary infection or metastasis of, the pancreas.

The anterior surface of the pancreas is separated from the transverse colon by the lesser peritoneal sac, and the colon itself may actually be in contact with the inferior surface of the pancreas. A colitis may be followed by pancreatitis, and in my opinion lesions of the colon are perhaps the most frequent sources of infection of the pancreas.

Since the spleen, the left kidney and the left suprarenal body are in contact with the tail of the pancreas, the primary infection in pancreatitis may be in one of those organs.

HEMATOGENOUS INFECTIONS.

Pancreatitis undoubtedly may be of hematogenous origin, and the removal of focal infections from the tonsils and teeth should receive the same consideration as in the inflammatory diseases of other organs of the body.

Pneumonia, measles, scarlet fever, influenza and other general infections may also cause pancreatitis. Many diabetics assert that a few months after an illness from some of the acute communicable infections, sugar was first found in their urine. It is possible that the recent severe epidemics of influenza or "flu" may account partly for the apparent increase in diabetes in the last few years.

Syphilis, while not playing the important part that some have thought, no doubt does affect the pancreas. We have had one case recently in which we thought syphilis was the

cause of diabetes. The story of the negro who, after a positive Wassermann, was told that he had syphilis, replied: "Yassir boss, I knows dat but I's sick too," illustrates the fact that the syphilitic may have diabetes without luetic involvement of the pancreas. It may also be a fact that a person has had diabetes for months or years and contracts syphilis and sugar is found in his urine when undergoing treatment for the latter condition. Clinicians of large experience generally agree that syphilis is not a frequent cause of diabetes.

It would seem, since the blood supply of the pancreas comes from the superior and inferior pancreaticoduodenal branches of the hepatic and superior mesenteric arteries, and from the splenic artery, that infections of the intestinal tract would be carried in the blood stream to the pancreas; and that intra-abdominal lesions are the most frequent sources of pancreatitis. McCarrison made sections of the intestines of pigeons in which he had produced an enteritis by feeding them exclusively pure carbohydrates. These sections, on microscopic examinations, showed eroded villi with the blood tract therefrom leading to distended subperitoneal vessels, constituting a direct passage for intestinal organisms to the blood stream. The intestines harbor the various streptococci, the colon bacillus and other pathogenic organisms, and there then can be no question but that enteritis and colitis in human beings are the foci of infection for the pancreas and even the remote organs of the body.

Since the pancreas is rich in its lymphatic relations with the intestines and other abdominal viscera, its afferent lymph channels no doubt often bring to it pathogenic organisms from adjacent diseased tissues.

GASTRO-INTESTINAL INFECTIONS AS PRIMARY FOCI IN THE PRODUCTION OF PANCREATITIS AND DIABETES.

We know that infections of the gastro-intestinal tract are among the most frequent diseases of both infant and adult life; and in my opinion that is the source to which many of the infections of the pancreas with the resulting impairment of the insulin forming glands must be finally traced. I have not seen any statistics on the incidence of gastro-intestinal diseases in the United States, but I am convinced that they are increasing. Recent re-

ports from various clinics in England show that 25 per cent of all patients admitted have abdominal lesions. When we consider the large number of abdominal operations for appendicitis, gastric and duodenal ulcer, and gall-bladder infections, as well as the frequency of the medical diseases of the gastro-intestinal tract, such as acute and chronic gastritis, enteritis and the colitis associated with both diarrhea and constipation, it surely seems that gastro-intestinal diseases are among the most frequent of the present time.

The causes for the increase in diseases of the digestive organs have been ascribed by McCarrison to faulty food. In his book "Studies in Deficiency Disease," and in his Mellon lectures before the Society of Biological Research, University of Pittsburgh, November 18, 1921, and published in the *Journal of the American Medical Association*, Vol. 78, No. 1, pp. 1-8, McCarrison describes his experiments on animals, and his observations among the natives of the Himalaya Mountains, which seem to prove that infections of the intestinal tract, particularly colitis, result largely from the present day diet of an excess of carbohydrates, fats and meat proteins, with a deficiency of the anti-neuritic and the anti-scorbutic vitamins, in addition to the lack of other requisite constituents of human food, particularly iodine, calcium and phosphorus.

McCarrison fed healthy monkeys on pure carbohydrates, fats and proteins—a diet similar to that of white bread, polished rice, potatoes, sugars and sweets of all kinds, lean meats, animal and vegetable fats, upon which most civilized peoples live—with a constantly resulting enterocolitis. He fed control monkeys on a diet containing the same amounts of carbohydrates, fats and proteins, but with the proper vitamins and mineral substances, and the control animals remained normal. He fed pigeons on autoclaved polished rice with the result that they not only developed enteritis and colitis, but a polyneuritis.

MCCARRISON'S CONCLUSIONS.

McCarrison thinks that our present day diet of an excess of carbohydrates, fats and lean meats, with a deficiency of vitamins and mineral content, by lowering resistance of the tissues of the gastro-intestinal tract, deprives them of their protective power to prevent invasion of pathogenic organisms. He found

that properly nourished monkeys, when given quantities of the entameba histolytica, did not develop dysentery, while those fed on a deficiency diet promptly developed diarrhea and the characteristic lesions of amebic dysentery.

McCarrison also called attention to the fact that in his nine years' practice among the inhabitants of a remote part of the Himalayas, during which time he performed an average of 400 major operations a year, he did not see a case of asthenic dyspepsia, gastric or duodenal ulcer, appendicitis, mucous colitis, or other digestive diseases, this in spite of the fact that the general hygienic conditions were bad. He thought this freedom from the abdominal infections so prevalent among civilized people was due to the fact that all infants were fed upon mother's milk, or they died; and that the adults among these remote tribes of the Himalayas lived on natural foods, i. e., milk, eggs, fresh fruits, leafy vegetables. They had no sugar or alcohol. McCarrison came to the same conclusion as Hinshelwood that "the two chief causes of death among civilized people are food and drink."

INTESTINAL STASIS A CAUSE OF COLITIS.

Applying to human beings the deductions drawn from animal experiments, McCarrison called attention to the similarity of the conditions observed in the intestines of animals fed on an exclusive pure carbohydrate diet and the anatomical factors seen in chronic intestinal stasis. Intestinal stasis, in my opinion, exists in a large majority of adult Americans. X-ray studies of the gastro-intestinal tract is a routine procedure in the examination of our patients. We find that in more than 75 per cent of cases the barium meal is still in the cecum and ascending and transverse portions of the colon 24 hours after ingestion. Examination of the feces is another routine laboratory procedure in our work and a large proportion of cases show mucus present in the specimens. Intestinal mucus means a lesion somewhere in the small intestines, or colon—we think usually in the colon. We have found intestinal stasis and mucus in the feces in many of our diabetics, and it seems to me that a chronic colitis is often the source of infection in the pancreatitis which impairs the function of the islet glands to the extent that diabetes develops.

DIABETES THE VESTIGIUM OF A BURNT-OUT CONFLAGRATION.

Allen speaks of diabetes as "the vestigium of a burnt-out conflagration." He made investigations on animals in which he produced experimental pancreatitis followed by hyperglycemia, thus proving to his satisfaction that a damaged pancreas is an essential factor in the etiology of diabetes.

It may be that the pancreatitis occurred years before the glycosuria is discovered and that the anamnesis does not elicit a history of a previous pancreatitis; but I believe that we may assume a previous or a present pancreatic infection in the majority of cases of diabetes and that we should endeavor to find the cause of the pancreatitis and remove it if possible. It seems probable, though it is not possible to prove it, that in many cases the pancreatitis was associated with the intestinal infections of infancy and that, though the pancreas be permanently damaged, the Islands of Langerhans are able to secrete enough insulin for normal carbohydrate metabolism in a person of average weight; but that in obesity, the overworked, crippled pancreas rebels against the load that has been placed upon it by the individual who over-eats.

Those who believe that over-eating is the sole cause of diabetes in many cases, and that the obese individual is potentially a diabetic, point to the fact that even in severe diabetics sometimes no lesions of the Islands of Langerhans can be demonstrated either macroscopically or microscopically. Allen meets this objection to the theory of a preceding pancreatitis as an important underlying factor in the production of diabetes, by stating the fact that he has produced pancreatitis in animals and that after their recovery autopsies have revealed no evidence whatever of the pancreatic infection which he knew had existed.

Banting is of the opinion that a pancreatitis is an important though not the only etiological factor in diabetes and, in support of this opinion, he cited instances in the Children's Hospital in Toronto in which the removal of infected tonsils was followed by a return to the normal, or a marked reduction in the blood sugar of infant diabetics.

THE ROLE OF OVER-EATING IN THE ETIOLOGY OF DIABETES.

The theory of a previous pancreatitis in

diabetes should not make us underestimate over-eating as a large factor in the production of diabetes. The statistics of Joslin* show clearly that the majority of diabetics, 60 per cent, are, or have been, overweight. Most of our diabetics give a similar history. Paulin† showed that the blood sugar was high in obese individuals who did not have glycosuria, and his conclusion was that they were potentially diabetics; but the normal pancreas can stand a heavy load and the great majority of obese individuals do not develop diabetes. Over-eating and a diet deficient in vitamins plus a damaged pancreas seem to me to be the important etiological factors in diabetes.

THE IMPORTANCE OF VITAMINS IN THE DIABETIC'S DIET.

In the treatment of diabetes it is as necessary to consider the vitamin content and the proper mineral constituents of food as to know that the starches and sugars and proteins and other glucose-forming foods are reduced to the patient's tolerance. Therefore, in making up the diabetic's menu, the fats should consist largely of butter and cream, which are rich in vitamin A; the carbohydrates should come principally from the green vegetables, which contain not only vitamins A, B and C, but are rich in iron calcium, phosphorus and other essential minerals, and from raw fruits and uncooked vegetables which contain the antiscorbutic vitamin. The diabetic should be taught the vitamin and mineral values of his daily diet as well as the arithmetic of carbohydrates, fats and proteins.

I have recently had a case which illustrates the necessity of considering the vitamin content of the diabetic's diet. A young diabetic who had learned to weigh and measure his food in grams and who could estimate accurately the number of calories of proteins, carbohydrates and fats he could eat to keep his urine free from sugar and diacetic acid, had not learned anything of vitamins. He did not like milk and butter and had omitted them from his diet for years. On a daily diet of about 1250 calories, low in quantity and deficient in vitamins, he developed tuberculosis which with him was more serious than the diabetes. He undoubtedly had diabetes because it was pronounced so by one of the greatest diabetic clinicians in the country, and while the low

diet allowed tuberculosis to develop, the function of the insulin-forming glands seems to have been restored. He is now in San Antonio, Texas, taking 3500 calories of a diet rich in vitamins and his urine remains sugar free. He has gained 25 lbs. in weight and seems to be recovering from the tuberculosis and apparently his diabetes has also been at least temporarily relieved.

HEREDITARY AND RACIAL SUSCEPTIBILITY.

There are many other factors in the etiology of diabetes beside infections of the pancreas: because autopsies have shown extensive lesions of the pancreas with degeneration or destruction of a large part of the islet bearing tissue in persons who had no symptoms of diabetes during life. Heredity and racial characteristics are said to play a part and it may be true that one may, by inheritance or racial tendency, have a lowered resistance to infections of the pancreas. It seems likely, however, that what are often considered hereditary and racial tendencies are acquired conditions from habit and environment. For instance, it is no doubt true that the incidence of diabetes is greater among Hebrews than any other race. They also in my opinion suffer more from digestive disturbances than the individuals of other races. The Hebrews live in the cities. They are prosperous, they have plenty of food and are usually large eaters. They eat meats, fats, bread and sweets, but they are not vegetable eaters and their diet may be deficient in vitamins B and C. They also lead sedentary lives which predispose to intestinal stasis and colitis which, in my judgment, is the primary source of a large part of the infections of all the abdominal organs including the appendix, gall-bladder, liver and pancreas. So it may be that prosperity and city life have more to do with the incidence of diabetes among the Hebrews than has heredity and racial tendencies.

The Jews are known to have less tuberculosis than any other race in America. That too probably is not due to racial insusceptibility but to the fact that from the time of Moses, who described the "promised land" as flowing with milk and honey," to the present day, milk and butter, which are rich in vitamin A, the great protector against tuberculosis, have been an important part of the Jew's daily diet. The problem, therefore, in decreasing the in-

*Joslin: "Diabetic Manual," page 19, Lea & Febiger, 1919.
†Paulin: Southern Medical Journal, Vol. XV, 1922, p. 249.

cidence of diabetes among the Jews is to teach the sins of eating an excess of meats, bread, sweets and fats, and their need for eating more green vegetables and fruits that are rich in vitamins B and C, the protectors against infection of the alimentary canal.

The negro race is said to be less susceptible to diabetes than the whites. That too is probably not due to racial resistance to infections of the pancreas but to the negro's love for the green vegetables, fruits, milk and butter which are cheaper than meats and which contain the vitamins and mineral constituents which go to make up sound teeth and a healthy alimentary tract. For the same reason the negro is less susceptible to all abdominal diseases, including appendicitis and gall-bladder infections. It is likely that the deficiency of vitamin A in the negro's daily diet, more than any other factor, renders him less resistant to the ravages of tuberculosis instead of his having any racial susceptibility to the disease.

Emotional disturbances undoubtedly may bring on hyperglycemia as has been observed in many cases, but in these a damaged pancreas is probably the preceding cause. I recently had a patient who had shown sugar in his urine and had a high blood sugar while he was at work, about which he worried a great deal. After a few days' rest in bed in the infirmary, his urine became sugar free and his blood sugar normal and remained so for a month, even though he was allowed breads and other carbohydrates in large quantities; but on his return home to the worries incident to his business, the sugar in his urine returned. When he cut his work to six hours a day and ceased worrying, the sugar again disappeared from his urine.

Worry, overwork, grief and psychic shock of any kind that disturbs the sympathetic nervous system, may bring on transient glycosuria, but it is unlikely that permanent hypoin-sulinism results from nervous influences in the individual with a pancreas that has not been crippled by previous disease.

THE DEFICIENCY DIET OF THE AMERICAN PEOPLE.

McCollum's observations on the diet of the American people as a factor in mouth infections apply equally to infections of all the organs of digestion, including the pancreas. He points out the fact that a diet of white

bread, potatoes, refined cereal breakfast foods, polished rice, and sweets, the muscle cuts of meat and fat meat, lard and butter substitutes, is deficient in vitamins B and C, and lacking in calcium, iodine, phosphorus and other essential minerals. He is urging the American people to go back to the diet of our parents and grandparents, who lived on bread made from whole wheat flour, or whole corn bread, unpolished rice, milk and its derivatives, butter and cheese; the green vegetables and raw fruits, with a moderate amount of meats. McCollum has announced a formula of the perfect daily diet, i. e., "one raw fruit, one uncooked vegetable, two green vegetables and one quart of milk a day," to which should be added enough bread, butter and meat to meet the nutritional needs of the body. This diet, if carried out by the American people, would result in an enormous decrease in diabetics, along with a lessened number of cases of intestinal infections.

In my opinion, McCollum, Sherman, Funk and many others, in their studies in nutrition, have made discoveries which can be made of as far reaching good to mankind as the work of Pasteur and Lister. If what physicians now know of diet and nutrition were known and the knowledge applied by the public, diabetes would become a rare disease. The problem, therefore, is to teach all classes that can and will learn the simple principles of diet and nutrition.

EDUCATION IN THE PREVENTION OF DIABETES.

Thomas Jefferson said: "The present generation is already lost; teach the youth of the country" and he founded as his life's greatest work the University of Virginia. Jefferson was only partly right, because some adults can learn and apply new knowledge, though the great majority, even though they know it, will shorten their lives, will continue the eating habits they learn in their youth. Calories and vitamins will continue to be a joke with most obese men or women until nephritis or diabetes over takes them; and the hope of the future, in so far as preventing the diabetes and other degenerative diseases is concerned, lies in teaching the children the simple facts regarding the quantity and quality of the food needed for perfect nutrition. Something is already being done in teaching personal hygiene, including diet and nutrition, in the schools and colleges, but we should not stop

until every boy and girl in the land, even before they enter the high school, shall have a working knowledge of the nutritional needs of their bodies.

Diabetes is as much of a public health problem as typhoid fever, but the death rates of the former have increased while the latter is being reduced everywhere. From the viewpoint of prevention, diabetes is largely a matter of diet, or personal hygiene, while typhoid prevention is largely a question of public hygiene. Our public health authorities and the medical societies should take up the fight against diabetes. They should confer with the educators and the school boards in their communities to the end that every private and public school and college everywhere shall give instruction in personal hygiene, particularly in diet and nutrition.

The organized medical profession can also help in the fight by giving the public the facts regarding the alarming increase in diabetes, while at the same time stressing the fact that it can be prevented by eating more green vegetables and more raw fruits and less meats, less white bread and less sweets. Since the public has learned of the use of insulin, people generally are interested in the subject of diabetes; and now is the psychological time to begin the campaign for its prevention. Will the medical profession live up to its opportunities in preventing diabetes, as it has done so nobly in the fight against communicable diseases?

Empire Building.

THE TREATMENT OF DIABETES WITH DIET AND INSULIN.*

By ELLIOTT P. JOSLIN, M. D., Boston, Mass.

The necessity for the treatment of diabetes by physicians generally rather than by specialists is apparent when one considers that one death out of fifty in Boston and New York is from diabetes. Exactly how common the disease is in the country, it is difficult to determine. It is probably safe to say that there exist today at least one million individuals who either have diabetes or will develop it before they die.

The cardinal causes of death of my diabetics have been four: diabetic coma, cardio-renal with vascular disease, infections, and tubercu-

losis. Coma has been responsible for the death of fifty-one per cent of 887 of my fatal cases, cardio-renal with vascular disease seventeen per cent, infections sixteen per cent, and tuberculosis six per cent. During the last four years thirty-three deaths have occurred in hospitals, and the reasons for a fatal issue in this hospital group are so different that they challenge attention. Coma and infections have changed places. The mortality from coma has dropped to twenty-one per cent and the mortality from infections has risen to forty-five per cent. The reduction in the percentage of deaths from coma is attributable to (1) a diet low rather than high in calories and qualitatively regulated, (2) prompt inauguration of certain prophylactic and preventive measures in patients liable to coma, and (3) insulin. On the other hand, the proportionate increase in the percentage of deaths from infections is explained chiefly by the deaths from gangrene of the lower extremities and secondarily from other infections, both general and local.

The diet in diabetes should be moderate in quantity. Excess in food is the most common precursor of diabetes, and it is therefore irrational to continue what has already proved harmful. For this reason the first step taken with patients beginning treatment should be to curtail the amount of food. Examination of Table I shows that upon the first day of the test diets (T. D. 1) the calories have been reduced to 1,304 calories, which are about two-thirds of the average calories taken by an adult weighing 154 pounds (70 kilograms). As a matter of fact, in practice I usually begin with test diet two (T. D. 2), which amounts to 931 calories. If this reduction in calories does not result in making the patient sugar free, advance is made to lower calories, which are found in test diet three and test diet four. As will later be shown, with the use of insulin one seldom needs to employ test diet four with its few calories or the next diet below it, and also below the line, with a still smaller number.

Reduction in carbohydrates accompanies the lowering of calories in the test diets employed to get the urine of the diabetic sugar free. If the patient is passing very large quantities of sugar in the urine, one can begin with test diet one, though usually one commences with test diet two, which contains about 100 grams carbohydrate. After one day of this diet, one can proceed to test diet three, with 66 grams

*Read by invitation as part of the Symposium on The Pancreas, at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

TABLE I.
INSULIN DIABETIC DIETS.

	Diets	Total Diet				Carbohydrate (C)						Protein and Fat (PF)				
		Carbohydrate	Protein	Fat	Calories	5% Vegetables	Orange	Oatmeal	Shredded Wheat	Uneda	Potato	Egg	Cream 20% fat	Bacon	Butter	Meat
TEST	T.D.1	181	46	44	1304	300	300	---	3	4	240	3	120	---	---	1
	T.D.2	101	35	43	931	300	300	---	1	2	120	3	120	---	---	2
	T.D.3	66	24	37	693	300	300	---	1/2	2	---	2	120	---	---	3
	T.D.4	34	15	30	466	300	200	---	---	---	---	1	120	---	---	4
MAINTENANCE	C1+PF1	14	15	30	386	300	---	---	---	---	---	1	120	---	---	1
	C2+PF2	22	19	37	497	300	100	---	---	---	---	2	60	---	15	2
	C3+PF3	32	24	37	557	600	100	---	---	---	---	2	60	---	15	3
	C4+PF4	42	29	52	752	600	200	---	---	---	---	2	60	30	15	4
	C5+PF5	52	32	66	930	600	200	15	---	---	---	2	60	30	30	5
	C6+PF6	64	44	83	1179	600	200	30	---	---	---	2	120	30	30	6
	C7+PF7	74	52	88	1296	600	300	30	---	---	---	2	120	30	30	7
	C8+PF8	84	61	94	1426	600	300	30	---	2	---	2	120	30	30	8
	C9+PF9	98	65	106	1606	600	300	30	1/2	2	---	2	180	30	30	9
	C10+PF10	109	66	119	1771	600	300	30	1	2	---	2	180	30	45	10
	C11+PF11	135	80	135	2075	600	300	30	1	2	120	2	240	30	45	11
	C12+PF12	159	84	135	2187	600	300	30	1	2	240	2	240	30	45	12

carbohydrate, and so on to test diet four upon the next day unless the Benedict test is negative. In former days still lower carbohydrates and less calories were frequently required to banish the urine sugar and even a day of fasting would occasionally be interpolated, and thereafter one would progress day by day, C₂PF₂, C₃PF₃, etc., increasing the diet in both calories and carbohydrate until sugar reappeared. Then one would drop back a line or two (10 to 20 grams) in carbohydrate and adjust protein and fat by increasing the protein fat (PF) number. Today insulin shortens the stay, and one often jumps from T. D. 3 to C₆PF₆, which contains nearly the same amount of carbohydrate, but distinctly more protein and fat.

The above system of gradually reducing the total calories and the carbohydrate until the urine of the patient becomes sugar free, and thereupon gradually raising the carbohydrate until the carbohydrate tolerance is obtained and then making any necessary adjustments of protein and fat, accounts for the lessened prevalence of coma in hospital patients.

Under-nutrition is the keynote of all modern diabetic diets. I have laid emphasis on lowering of fat, Newburgh and Marsh on lowering of carbohydrate, and Petrén especially on lowering of protein, but all are indebted to Allen for a preliminary lowering of total calories.

The protein requirement is fundamental. For a young child 2 or 3 grams per kilogram are desirable, for a youth 1.5 grams, for an adult 1 gram, and after sixty it may be lowered to 0.66 gram per kilogram body weight. Not alone for maintenance of body tissue is the protein requirement fundamental, it is even more fundamental in severe cases to prevent acidosis. Protein underlies the proper balancing of fat and carbohydrate, the ketogenic-antiketogenic ratio. If the protein is 1 gram per kilogram body weight and only that amount of carbohydrate given which enables the patient to be sugar free, the fat may be raised to thrice the grams of carbohydrate. If necessary calories are not secured, the protein must be lowered to 0.66 gram per kilogram body weight and then the fat can be four or even five times the carbohydrate, provided the carbohydrate is so low as to eliminate glycosuria. Under either of these conditions there is no danger of acidosis, or, in other words, the ketogenic-antiketogenic ratio is not exceeded. The calories required for a patient depend first of all on maintenance of strength and weight. They seldom vary far from 30 per kilogram body weight in adults, but children may require twice as many. The foods which make up the diet of the diabetic should not be too varied. Otherwise they are confusing for both doctor and patient to estimate in carbohydrate, protein, and fat values. After demon-

strating ability to keep sugar free on standard onings to the foods shown in Table II. My
foods, the patient may experiment with them. aim is to make the routine diet as simple as
My patients usually confine their dietetic reck- possible.

TABLE II.
FOODS ARRANGED APPROXIMATELY ACCORDING TO CONTENT OF CARBOHYDRATES.
*Water, Clearbroths, Coffee, Tea, Cocoa Shells and Cracked Cocoa Can be Taken Without Allowance
for Food Content.*

		5%	10%	15%	20%
		*Reckon average carbohydrate in 5% veg. as 3%—of 10% veg. as 6%.			
VEGETABLES (fresh or canned)	1%-3%	3%-5	10%	15%	20%
	Lettuce Cucumbers Spinach Asparagus Rhubarb Endive Marrow Sorrel Sauerkraut Beet Greens Dandelions Swiss Chard Celery Mushrooms	Tomatoes Brussel Sprouts Water Cress Sea Kale Okra Cauliflower Egg Plant Cabbage Radishes Leeks String Beans, canned Broccoli Artichokes	String Beans Pumpkin Turnip Kohl-Rabi Squash Beets Carrots Onions Green Peas, canned Strawberries Lemons Cranberries Peaches Pineapple Blackberries Oranges	Green Peas Artichokes Parsnips canned Lima Beans, Raspberries Currants Apricots Pears Apples Blueberries Cherries	Potatoes Shell Beans Baked Beans Green Corn Boiled Rice Boiled Macaroni Plums Bananas Prunes
FRUITS	Ripe Olives (20% fat) Grape Fruit				

1 gram protein, 4 calories.
1 gram carbohydrate, 4 calories.
1 gram fat, 9 calories
6.25 gram protein contain 1 g. nitrogen.

1 kilogram=2.2 pounds.
30 grams g. or cubic centimeters c.c.=1 ounce.
A patient "at rest" requires 25 calories per kilogram

30 Grams 1 oz.	Carbohydrates	Protein	Fat	Calories
Contain Approximately	G	G	G	
Vegetables 5% -----	1-----	0.5-----	0-----	6
Vegetables 10% -----	2-----	0.5-----	0-----	10
Shredded Wheat -----	23-----	3-----	0-----	104
Uneddas, two -----	10-----	1-----	1-----	53
Potato -----	6-----	1-----	0-----	28
Bread -----	18-----	3-----	0-----	84
Oatmeal, dry weight -----	20-----	5-----	2-----	118
Oysters, six -----	4-----	6-----	1-----	49
Milk -----	1.5-----	1-----	1-----	19
Meat (cooked, lean) -----	0-----	8-----	5-----	77
Fish -----	0-----	6-----	0-----	24
Chicken (cooked, lean) -----	0-----	8-----	3-----	59
Egg (one) -----	0-----	6-----	6-----	78
Cheese -----	0-----	8-----	11-----	131
Bacon -----	0-----	5-----	15-----	155
Cream, 20% -----	1-----	1-----	6-----	62
Cream, 40% -----	1-----	1-----	12-----	116
Butter -----	0-----	0-----	25-----	225
Oil -----	0-----	0-----	30-----	270

Thomas Groom & Co., Inc., 105 State St., Boston.

Education of the patient in the prevention of coma is the second factor which has reduced my coma mortality. Patients have been taught for some years, whenever they feel "sick," I seldom say "ill," (1) to go to bed, (2) to take a cupful of hot liquid every hour, hot water, coffee, tea, broth, water-oatmeal gruel, or, instead of the gruel, orange juice, (3) to get a nurse in order to conserve strength and save burning body calories, (4) to keep warm, (5)

to take an enema, and (6) to call the doctor. In other words, they are taught to regard any indisposition as premonitory of coma. They are not to diagnose their cases.

The first function of the doctor when he arrives is to diagnose the coma. A diabetic can have coma from acid poisoning, but his coma may be due to apoplexy, uremia, morphine, septicemia, meningitis, trauma, or hypoglycemia. Indeed, the doctor who is called to a case of coma in a diabetic must use every scrap of medical knowledge and skill with which books and experience have endowed him. Insulin is useless in all comas save those due to acidosis, and the physician must beware.

If the diagnosis of diabetic coma is established, the second function of the doctor is to give insulin, and the technic will be described shortly. His third duty is to provide by subcutaneous injection of salt solution a sufficient amount of liquid for the patient by which acid bodies can be excreted. A quart of salt solution given subpectorally ensures a supply of liquid in contrast to its precarious administration by mouth or rectum, whereby it is often expelled. Support of the heart is a fourth requirement, and this is accomplished with digitalis and caffeine. Frequently, and especially in children, there is a fifth indication: namely, gastric lavage. Dilated stomachs are by no means infrequent and such are dangerous, not alone because they deprive the tissues of needed fluid, but also because of reflex action upon the heart. A sixth demand upon the doctor arises only in the event of a fatal issue. Then an autopsy is essential, first to establish the diagnosis and second to afford an opportunity to secure information which will help in the treatment of another case.

It is fitting thus to discuss the dietetic treatment of diabetes which has been built up through the ages with laborious effort, and the prevention of coma which the last generation has developed, because without this knowledge insulin therapy would be not only futile, but often fatal.

Insulin has allowed forty-six out of forty-eight children coming under my care August 7, 1922, or later, to be alive at the end of twelve months. I need say no more for its efficacy. One of the two deaths resulted from the omission of the insulin by a child who kept on eating the enlarged diet which its use had afforded. After five days he chanced to develop an in-

fection, which always makes any diabetes more intense, and he shortly went into coma and died within seven hours of admission to the hospital. Such a death should be preventable. This is one danger connected with insulin therapy. The other death was that of a child reported to be in coma about 100 miles from Boston whose transfer to the hospital did not begin until some twenty-four hours after permission was given for admission. She also lived about six hours following arrival. Such a case would far better have been treated at home. The insulin should be taken to the patient rather than the patient to the insulin.

An overdose is the second danger one encounters from insulin. This is known as a reaction and is associated with a lowering of the percentage of blood sugar below the normal level, 0.10 per cent. So soon as the blood sugar falls below 0.08 per cent, certain definite symptoms appear, and perhaps the first notable symptom is extreme hunger. As the blood sugar falls to this figure, perspiration, which is often apparent upon the forehead, and tremor develop. If the blood sugar reaches 0.045 per cent or below, unconsciousness usually develops and may be accompanied by convulsions.

Perhaps not over two of the less than 100 reactions, which have occurred in the course of more than a year with my patients, have been accompanied by unconsciousness. This I ascribe to the use of small doses of insulin.

The antidote to a reaction from insulin is the administration of glucose. Commonly this is taken by the patient in the form of orange juice. It may be taken as corn syrup or actual sugar, because most sugars turn to glucose immediately upon ingestion. With children the syrup or honey may be given when it is difficult to administer more liquid foods. Ten to fifteen grams of glucose suffice as a rule to banish the symptoms of a reaction and the antidote may work within five minutes. Adrenalin acts similarly, and 10 minims of a 1-1000 solution injected subcutaneously act promptly. One should be somewhat cautious, however, in the administration of adrenalin to be sure that there is enough available carbohydrate in the body to allow it to be mobilized.

The first dose of insulin administered to a patient at the New England Deaconess Hospital is usually 1 unit, and this is increased by 1 unit before each meal until by the fifth meal the patient is taking 5 units before a meal.

Thereafter 5 units are given about twenty minutes before each meal. At the same time the changes in diet take place which have been outlined above, because treatment with insulin should work hand in hand with treatment with diet. If the urine of the patient does not promptly become sugar free, the dose is changed to 6 units before a meal or even 7, 8, 9, 10, or more units. So soon as the urine becomes sugar free, then the noon dose is usually omitted and the total dose divided into two doses, that before breakfast being somewhat larger than that before supper.

If the patient remains persistently sugar free upon a maintenance diet, the attempt is made to omit the evening insulin by gradually decreasing the dose by 1 unit every one or two days, and in a good many cases this is possible. Then one attempts to lower gradually the morning dose. As a matter of fact, about ten per cent of my cases treated with insulin have been able to omit it entirely.

Small doses have characterized my method of treatment. In fact, at the close of the first year of insulin medication there were but about 20 out of 300 diabetics taking insulin who were receiving 20 or more units of insulin daily. Insulin is in its infancy, and it has seemed advisable to proceed slowly with it. As a rule it has been necessary to increase the dose somewhat as time has elapsed.

The morning dose of insulin should usually be the largest administered during the day, and, conversely, the quantity of carbohydrate at breakfast should usually be the lowest. These rules, however, are not invariable. Before changing the dose of insulin it is always desirable to determine whether the carbohydrate is properly divided at the different meals. For this purpose single specimens of urine throughout the day should be tested qualitatively and the results balanced against the dosage of insulin and the intake of food. Patience and study often will obviate the necessity for an increase in insulin.

The test of single urinary specimens during the twenty-four hours is of the greatest value in the treatment of diabetes, and its importance has been especially urged by my associate, Horace Gray. By this method general practitioners can treat satisfactorily many cases of diabetes without blood sugar determinations, and the advantage of this is obvious. In fact, it is because of the possibility of watching the

effect of insulin in this manner that I have felt it safe to urge the use of insulin by doctors throughout the country.

Diabetic coma requires larger doses of insulin, but before insulin is given to any patient with coma, the doctor must assure himself that the type of coma is really that due to acidosis and not due to apoplexy, uremia, meningitis, septicemia, morphine, or trauma. When the diagnosis of diabetic coma is assured, then insulin should be administered immediately and best intravenously for the first dose, though that is unessential. It is safe to give 10 units every hour and usually safe to give 15 units hourly for the first three hours. Fifteen units of the new insulin equal 21 units of the old, so dosage creeps up rapidly. One continues to give insulin in hourly doses until the hourly specimen of urine becomes sugar free or, if available, the blood sugar drops to nearly normal. It is essential each hour, before administering the insulin, to test the urine. Otherwise, severe reactions may be encountered. Following the commencement of recovery, insulin should be continued at less frequent intervals. It should not be permanently omitted. If this is done, a relapse may occur. Each case is a rule unto itself.

Gangrene, directly or indirectly, led to the death of twenty-three per cent of Boston's diabetics between 1895 and 1913 and is the next important preventable diabetic cause of death. Any diabetic above the age of fifty years should be cautioned against the possibility of developing gangrene. He should be warned of its dangers and should be told to protect his feet against injury by new shoes, hot water bags, trauma, and from careless treatment of toenails and corns, and of the necessity of reporting the slightest injury to his physician. Each physician should take pride in freedom from gangrene among the diabetic patients who consult him. He should be as zealous to protect all his patients from gangrene as from typhoid fever.

The surgical treatment of gangrene brings up the question of preparing diabetic patients for operation. With the advent of insulin, it is now safe to say to the surgeon that so soon as the lesion in question should be treated surgically, it is possible to have the patient ready for the operation. Food should be given in simple form, such as oatmeal gruel or orange juice, up to within three or four hours of operation, be-

cause so often patients do not eat for some hours after they leave the operating table, and consequently they are in a position to develop acidosis of greater or lesser extent. Water-oat-meal gruel and orange juice are the foods generally advised, because these are well borne by the stomach, and furthermore patients seldom will get in these two forms of food more than 50 grams of carbohydrate in the twenty-four hours after an operative procedure. Along with the food, insulin may be continued as heretofore with that particular case, although slight changes in the dosage may be necessary. Formerly none of my patients were operated upon with ether, but with insulin the surgeons are beginning to employ it again. However, all the amputations in the gangrene cases and all the prostatic operations for many months have been conducted under spinal anesthesia.†

81 Bay State Road.

A SYSTEM FOR THE USE OF INSULIN WITH THE DIABETIC DIET IN GENERAL PRACTICE.*

By WARREN T. VAUGHAN, M. D., Richmond, Va.

There can be no doubt that the more satisfactory plan of treatment for the diabetic is with hospitalization, and instruction by a qualified internist, or better a specialist in diabetes. Those who can afford this will obtain maximum therapeutic success, but we must at the same time consider how best to provide for that large number of individuals who for financial or other reasons cannot obtain hospital treatment and instruction. Those best qualified to discuss diabetes, while stressing the obvious advantages of carefully controlled scientific therapy, recognize the necessity of aiding the greater number who must do as well as they may under the guidance of the family physician.

It is undoubtedly for this reason that Joslin has spent years simplifying the technic of therapy, in the elaboration of his diet cards for the use of the general practitioner. That such efforts have met with success is shown by his observation that in Boston, for example, the average life of diabetics treated at home has been increased and the incidence of com-

plications, such as coma, decreased quite in proportion to similar improvements noted under the best hospital or class instruction. We may state with assurance that the treatment of diabetes by the medical profession in general has improved greatly with under-nutrition therapy. We may state with equal assurance that, except where the family physician has become especially interested in this disease or has received some post-graduate instruction, many of his patients are not treated as thoroughly or as systematically as they should be.

With the advent of insulin, the question arises whether treatment can be carried on at home with such a degree of success as to compare favorably with the results at the hands of the specialist. This much is certain, that for successful dietary or insulin therapy the patient or his physician, or preferably both must receive thorough preliminary instruction. This having been obtained the further treatment must be so systematized and simplified that it can be continued with a minimum of doubt or misunderstanding. Insulin has to a great extent rendered starvation treatment unnecessary but it has at the same time made accurate dietary regulation even more important. For this reason a new series of charts and tables must be evolved. The present paper deals with a system which the writer has found satisfactory for his own use, and which the patient, after discharge, carries out at home under the guidance of his physician.

A brief recapitulation of the general principles of insulin treatment is necessary, before we pass on to consideration of routine therapeutic measures. Because of limited time we must content ourselves with discussion of the average uncomplicated case.

Optimal Diet. The diet even under insulin should be no more than sufficient for the patient's metabolic needs. No attempt should be made to fatten patients needlessly. Theoretically the diet may be increased to any desired amount, provided sufficient insulin be administered and provided the proper balance between protein, fat and carbohydrate be maintained. It should not, however, be increased beyond such levels as will satisfy reasonable normal demands for energy. There are several reasons for this. Increased caloric intake causes increase of metabolic rate. This in turn calls for more food. There develops a more pronounced tendency towards hyperglycemia.

†A demonstration was given of a simple and accurate method for the quantitative determination of sugar in the urine. The apparatus is quite inexpensive and can be purchased of Emil Greiner & Son, 55 Fulton St., New York City.

*Read at the fifty-fourth annual meeting of the Medical Society of Virginia at Roanoke, October 16-19, 1923.

Increased intake necessitates more insulin and more frequent injections with consequent greater liability towards hypoglycemic reactions. Furthermore, if the patient who has attained a certain degree of obesity suddenly finds himself unable to procure his insulin, there is real danger of resultant acidosis. Extreme under-nutrition is no longer necessary, but moderate under-nutrition still appears preferable to hypernutrition.

In general a food intake of about 2,000 to 2,600 calories may be allowed in the average adult case. One man may attend to his daily duties with 2,000 calories while a larger man doing heavier work may require more. From the economic viewpoint a certain individual may do more efficient work with larger doses, thereby increasing his earning capacity. In such a case, the increased amount spent on insulin may even be a good investment. Accuracy of control is another factor. Thus Allen and Sherrill point out that a child of wealthy parents who will always be attended by a specially trained, highly intelligent nurse, may be fed more abundantly than another child treated on a charity basis who will ultimately have to carry the responsibility of his own treatment at home.

Insulin Dosage. The average unit is considered as metabolizing 1 — 1.5 grams of glucose. Occasionally one unit will reduce glycosuria by as much as three grams.* The ratio varies in practical work with the individual patient and particularly with the extent of glucose retention. When at the beginning of treatment the blood sugar is high and there is consequent greater concentration in the tissues, larger quantities of insulin are required to render the patient sugar free than is later necessary to keep him so. Thus in one case on a steady diet we have reduced the daily insulin dosage from fifty to twenty-five units.

In acidosis or coma, or with superimposed infections, the dose required is greater than without such complications. Most observers have found that in the average case from ten to thirty units are necessary to maintain the patient in equilibrium. As much as seventy units have been given daily.

My own dosages have varied between two and fifty-five units per day. An adult requiring but five units daily, whose blood sugar is not materially elevated, will often do as well

with slightly increased dietary restriction and the omission of insulin. In the case of growing children, on the other hand, it appears better to provide sufficient food to meet normal growth requirements, and to supplement with the insulin. I have also been giving small dosages of five units to a group of very mild diabetics in an attempt to permanently raise the sugar tolerance in the extremely early cases.

Woodyatt has developed a relatively simple system of dosage determination. On a basal diet he establishes a daily excretion of sugar. Thus if the individual excretes steadily twenty-five grams of glucose, twenty units will about render him sugar free. He then receives one-half of this calculated dose. This dose is increased by five units daily, and later the caloric intake is gradually increased to the desired amount.

Frequency of Administration. Opinion differs quite remarkably as to the number of injections that should be given each day. Allen and Sherrill advocate three injections, and even four in case the blood sugar rises at night. Joslin, Gray and Root as well as Banting, Campbell and Fletcher report satisfactory results from two doses. In mild cases the latter give a single daily dose before one meal in which most of the carbohydrate has been concentrated. Wilder and his associates obtained best results with single injections of the entire amount thirty minutes before breakfast, and with food distributed equally between the three meals. This was particularly so when the dosage did not exceed thirty insulin units. As a rule, the second meal comes early enough to neutralize any severe late effect on the blood sugar level. Woodyatt has practically eliminated multiple daily doses and in ninety per cent of all cases administers a single morning injection. Rarely he gives two doses a day. This of course does not apply to complications such as acidosis or coma.

Wherever possible I have used a single morning administration with food divided evenly between the three meals. In this way I have given as high as fifty-five units in a single dose without hypoglycemic reaction. This was in an individual exhibiting an unusually slow fall in glycemic level after injection. However, she did better and required less insulin when the insulin was divided into two doses. My experience also has been that where the

*On October 15, 1923, the strength of the standard unit was increased 40 per cent.

daily dosage exceeds twenty units, it is better given in divided doses. I give the major proportion before breakfast and a smaller amount before the noon meal, occasionally before the evening meal. Theoretically, it may be better to give three or even four injections daily, but in actual practice few patients will submit indefinitely to this number of needlings each day.

Must the Patient be Maintained "Sugar Free?" With few exceptions the urine should be maintained sugar free. Blood sugar well above normal provides some protection against the occurrence of hypoglycemia and also allows greater economy in the use of insulin. On the other hand, hyperlycemia may be a factor in the degenerative processes such as arteriosclerosis, optic neuritis and so on, and probably throws a greater load upon the islet tissue of the pancreas. Joslin, Gray and Root brought an average fasting blood sugar of 0.24 per cent down to 0.19 per cent at the end of treatment.

Hypoglycemia. The reaction of greatest importance following insulin results from too rapid or too great fall in blood sugar level, with resulting hypoglycemia. The symptoms are well known to all who have used insulin. Symptoms may develop with a sugar level as high as 80 milligrams per 100 c.c. The level at which symptoms appear varies in different individuals and at different times. Symptoms usually become pronounced at 60 to 50 milligrams. A glycemic level of 35 mg. per 100 c.c. is usually accompanied by unconsciousness. Reaction usually occurs two hours after administration but may be delayed. Joslin observed hypoglycemic symptoms after one insulin unit in a man with tolerance for 114 grams of carbohydrate, but who was weakened by diarrhoea. Allen has observed a reaction after one-half unit in an individual extremely weakened and emaciated, on a low diet. Heavy exercise increases the tendency to hypoglycemia.

Treatment consists in the administration of glucose, usually by mouth. Orange juice is very successful. Other sugars than glucose are not as highly recommended. If necessary, glucose may be administered intravenously. Hot tea or coffee and beef extracts produce temporary relief but no increase in blood sugar concentration and are followed by relapse. As a rule there is no recurrence after the administration of glucose. Often five grams will tide a pa-

tient along till the next meal. Twenty grams are frequently administered. Epinephrin is recommended in unconsciousness. This apparently causes a mobilization of tissue sugars into the blood. Such treatment must be followed by the giving of orange juice or some preparation containing a moderate quantity of dextrose.

Does Insulin Produce a Permanent Increase of Tolerance? Uppermost in the minds of all since the advent of insulin has been the question—"will its administration produce permanent cure?" It is still too early to prognosticate remote results, but the studies in general do not indicate permanent improvement in sugar tolerance. Although several cases have acquired some increased ability to metabolize glucose, the vast majority cannot cut down the amount of insulin as time goes on.

The foregoing principles cover only the more important phases of treatment. They serve, however, as the ground work for a routine plan of treatment. Complications, including acidosis, have not been considered, since they require highly individualized treatment and accurate laboratory control. In the absence of tables such as Joslin has prepared for under-nutrition therapy I have found that Wilder, Foley and Ellithorpe's Diabetic Primer satisfactorily fills the patient's requirements. Two editions have appeared and the daily diet lists appearing in the second are quite different from those of the first. The chief variance is in their higher fat content. It has been my experience that a mild diabetic does better on the relatively lower fat diets in the first edition, while some of the more severe cases, during the period of observation at least, do better on the higher fat diets. It is to be regretted that both series of diets were not incorporated in the second edition. To be sure the ketogenic-antiketogenic ratio of the high fat diets is within safe limits, but the large fat content often becomes distasteful to the patient. This is not the case with those diets found in the first edition of the book.

It is absolutely essential for success that the patient weigh his food and examine twenty-four hour urine collections, daily at first and at frequent intervals later.

Blood sugar determination is not indispensable in the treatment of a diabetic. However, a knowledge of the glycemic level at the beginning of treatment is most valuable and les-

sens the risk of hypoglycemia. It is also more satisfactory to know the glucose content of the blood after the urine has become sugar free.

The following program of treatment has proven satisfactory in my hands:

1. The patient procures and studies the Diabetic Primer, purchases scales, and learns to test his twenty-four urine collections qualitatively for sugar.

2. He is weighed and a general examination is made together with the necessary laboratory studies, including alveolar carbon dioxide tension determination. The results of this study may modify the plan of treatment.

3. After the twenty-four hour output of sugar has been quantitated, the patient is placed upon that diet in the Primer which should keep him in metabolic equilibrium without providing an excess of nourishment.

4. After two or three days on such a diet with daily sugar determinations, insulin administration is started, following very much the plan recommended by Woodyatt. Approximately one-half the calculated quantity of insulin necessary to render the patient sugar free is given on the first day and the amount is increased steadily each day, usually by five units, until sugar no longer appears in the urine. The drug is given in a single morning dose, preferably before breakfast.

5. Careful watch is maintained for acidosis or other complications, throughout the treatment by frequent physical examinations, regular urine studies, and, when necessary, repeated alveolar carbon dioxide tension determinations.

6. After the patient has become sugar free, and unless he be overweight, the diet and insulin dosage are adjusted so that he may maintain his weight.

7. A blood sugar determination at the end of the period of standardization will show the influence of treatment on the glycemic level and will indicate whether the amount of insulin should be further increased.

It has been my experience that if more than twenty units of insulin are to be administered, better results are obtained in broken doses. I customarily give the major portion before breakfast and a smaller amount before the noon or evening meal.

With the use of the special recipes and the food tables in the back of the Diabetic Primer, substitutions in the proper amount can be made

for practically any of the foods in the regular diet lists, so that the patient may eat those foods which are in season, or in fact nearly whatever he desires, provided the quantity thereof is properly regulated.

Contrary to the opinion of many, I find that in the absence of complications, instruction and treatment are more satisfactory if the patient is not placed in the hospital. From the beginning he works out his routine at home, where he will eventually have to be under any circumstances, and his results are discussed and his problems clarified in daily consultations at the office.

Medical Arts Building.

DISCUSSION OF PAPERS BY DRs. HOUGH, GRAVES, SMITH, OWNBEY, HARRIS, JOSLIN AND VAUGHAN.

DR. L. G. PEDIGO, Roanoke: I am very much interested in this subject, and want to ask one or two questions for information. I notice that the discussion is one confined to diet and insulin treatment. I want to know if this treatment is found to be incompatible with anything that has been found advantageous in the treatment of diabetes. At one time appendicitis, then gall-bladder condition, occupied the footlight, then high blood pressure; now everything from headache to a revolution is attributed to the teeth. What I want to know is whether insulin treatment is incompatible with anything else, the salicylates, for instance. The insulin is not new in so far as I can discover, as some twenty-five years ago it was used in hospitals in Europe, being used in the form of liquid extracts from the pancreas of healthy animals. Brown and Sequard wrote excerpts in the lower '90's that glycosuria could be checked down by the liquid extracts used hypodermically. Is insulin incompatible with the salicylates von Luren used with such success?

DR. STUART MCGUIRE, Richmond: I can add nothing of value to the discussion of the papers just read, but I rise to say how much I have been interested and instructed by this symposium. I could not help but think how fortunate it was that it was scheduled for the general meeting of the Society. If it had been put in the medical section then I and other surgeons would not have heard it. I think the subdivision of our Society into sections has been a great mistake. Surgical men should hear medical papers and medical men should hear surgical papers. If I had the authority, I would limit the number of papers on the program of our annual meeting and go back to the old plan of having all papers read in one general session. If this plan is not practical I would advocate requiring the surgeons to attend the medical section and medical men attend the surgical section, then we would all learn something instead of hearing as we do now the same old things over and over again.

I was very much amused at Dr. Harris' story of the Jew drummer he had lunch with on the dining car on his trip to Roanoke and his expert analysis of the food he ate. Jews as a rule are abstemious in the use of alcohol but consume large quantities of rich food, which explains why so many of them have diabetes. If the drummer in question had known Dr. Harris' identity, he might have been as much embarrassed as I was when, coming back from France on an Army transport, I sat next to Dr. Joslin at table. The trip took three weeks and I enjoyed his

companionship very much but I never got over the feeling that he was calculating the value in calories of all the food I consumed.

I want to take advantage of this opportunity to say that both Dr. Harris and Dr. Joslin did splendid work in the Army and that they made as good military officers in time of war as they now make medical experts in time of peace.

Dr. R. B. JAMES, Danville: Dr. Pedigo made a very good point for the average practitioner who cannot carry out the insulin treatment, which is not possible for the poor patient. Dr. Pedigo speaks of the pancreatic extract. Twenty-five years ago these were used extensively and with good results but we do not hear so much of them today. There are certain cases, however, that cannot be controlled by diet and pancreatic extract and these heretofore have been hopeless cases but insulin seems to offer them relief. Most cases can be kept comfortable by diet alone, others by diet and the pancreatic extract. I have three cases now that are doing well under this treatment. Salol, the salicylates and other intestinal antiseptics helped in many cases, but I have found none so good as the pancreatic extract.

Dr. EDWARD SANDIDGE, Amherst: At what stage should diabetics be given this insulin? If you have a patient in good health apparently, with no symptoms of diabetes—no nausea, no dryness of skin—except glycosuria which is generally worse before menstrual period, would you give insulin when she shows no symptoms of diabetes, otherwise?

Dr. E. E. WALKER, Phenix: Can sugar occur in the blood without showing a trace in the urine? Suppose a man is to have some sugar today, then would have more by eating a certain food, will insulin get that out?

Dr. THEODORE HOUGH, University: Just one point I should like to clear up in closing—the point referred to by Drs. Pedigo and James, that in times past pancreatic extracts have been used, and possibly at times with beneficial effects. It is equally true that they have much more frequently been used without any effect and we know why this is so.

Both gastric juice and pancreatic juice have been shown to destroy insulin, the active agents in each case being the proteolytic ferments. Ordinary extracts of pancreas usually contain active trypsin; sometimes they do not. Some of these extracts may, therefore, possibly have been effective; but usually the insulin had been destroyed by the trypsin.

Dr. SEALE HARRIS, Birmingham, Ala.: Aside from the great honor of an invitation to address you, it is worth the trip from Birmingham to have heard this symposium on diabetes. All of the papers and discussions have been greatly enjoyed, particularly the one by Dr. Hough which is a classic, and of course, Dr. Joslin's address is the great feature of the occasion.

In the diet of diabetes it is not only important that the patient should understand diabetic arithmetic thoroughly, that is, he should know the exact amount of proteins, fats and carbohydrates that he should have for each of his three meals, he should also be taught the facts regarding vitamins. We recently had a patient who came to us for insulin and on examining him we found that he was well advanced in tuberculosis which undoubtedly had developed since he had been placed on a low diet for diabetes. He knew exactly the number of grams and calories of carbohydrates, fats and proteins that he should take and had kept himself sugar free for more than two years but he did not like butter and milk, the principal source of vitamin A. I think it is quite definitely proved that vitamin A is the great

protector against tuberculosis and other respiratory infections, and I believe had this patient been taught that milk, cream, and butter are the principal sources of vitamin A, he would not have developed tuberculosis.

Dr. Hough spoke of the credit which has been given the discoverer of insulin but not enough credit had been given to many others who have made great scientific discoveries. I agree with him that physicians who have made great discoveries have not received the praise which they deserve but I do not think that Dr. Banting has received more than the credit which is due him for what I believe to be the greatest discovery in medicine for this century. Indeed, I have never seen anything finer in my life than Dr. Banting's attitude regarding his discovery and I know that he has not been responsible for the publicity that has been given the discovery of insulin. He has given up the opportunity of great riches to accept the position as professor in the University of Toronto at \$7,500 a year. He will not receive one cent for the manufacture or sale of his great discovery. In giving credit for the wonderful advance in the treatment of diabetes, I think we should not forget that it was the work of Lusk, Attawater, Sherman, Allen, Joslin, Woodyatt and others who made it possible for insulin to be of value in the treatment of diabetes. Indeed, if we did not know food values and the amount of glucose-forming foods that the patient is taking, insulin would be too dangerous to use. With the adjustment of diet to the patient's need and to the amount of insulin that is used, there is no danger in insulin.

One of the physicians spoke of the use of pancreatic extracts by mouth. I think it cannot be stated too emphatically that no pancreatic extract that has ever been manufactured, or that ever will be manufactured, will have any effect whatever when given by mouth; because insulin, the only pancreatic extract that affects carbohydrate metabolism, is destroyed by the gastric and intestinal juices. Banting told me that in the Toronto Clinic they had tried to use insulin by mouth, by enteric capsules, through a duodenal tube into the intestines, and by rectum, and with absolutely no effect whatever on the blood sugar level. He is absolutely sure that the insulin can never be used any other way than hypodermatically or intravenously.

Dr. E. P. JOSLIN, Boston, Mass.: *Pancreatic extracts*: I have tried, besides insulin, two others and found that they did not work by mouth. Suppose you are giving insulin every day, then omit insulin and substitute an oral preparation. Perhaps no sugar will appear in the urine next day but, within five days after leaving off the insulin, the full form of the disease becomes manifest. Consequently, in testing any extract, one must wait at least five days.

I know of nothing which is incompatible with insulin.

I would not call a case of diabetes cured until a patient had lived at least twenty years. A woman in the hospital had a blood sugar of .09 per cent before a meal, 0.13 after meal. She appeared as if cured. When I increased her diet by twenty grams carbohydrate, the blood sugar went up to 0.19 per cent.

The cost of insulin is not great. Insulin is dropping in price and can be sold at a profit at two cents a unit, December, 1923. The average case does not take more than sixteen units. At the old price, buying wholesale for the hospital, it would cost forty-eight cents; by the new price, thirty-two cents, and even less, because now the unit is stronger. Is that too much? I have observed that the patient who

was too poor to pay for the treatment could smoke a couple of cigars daily. If a patient is doing well without insulin, do not give it. If a patient has no pain, one would not give morphine.

OPINIONS ON VARIOUS QUESTIONS IN GALL-BLADDER SURGERY, BASED ON ONE THOUSAND OPERATIONS.*

By STUART MCGUIRE, M. D., Richmond, Va.
Surgeon to the McGuire Clinic.

During the past twenty years I have operated on more than one thousand patients for disease of the gall-bladder. Recently I have had the cases tabulated and studied with the hope of securing data which would enable me to prepare a paper that would be interesting and instructive. I thought my files contained satisfactory case histories, laboratory reports and operative findings of these cases, but I am mortified to confess that when the records were put to the crucial test of furnishing accurate statistics, they proved woefully deficient. A case report, which on casual reading appeared most excellent, would almost invariably be found to lack some essential detail when it came to tabulating facts in parallel columns, and I have completed my labors "a sadder and wiser man." I recognize now more fully than I ever did before the necessity of the campaign being carried on by the American College of Surgeons to standardize hospitals and to emphasize the importance of keeping full, accurate and systematic case records.

The following are some of the facts I have been able to learn from the study of my gall-bladder cases. The youngest patient in the series was thirteen, the oldest seventy-nine, the average age being forty-five. This confirms the accepted belief that no age is immune but the disease is more frequent about middle life. Seventy-one per cent of my patients were women and twenty-nine per cent were men. This confirms the statement that gall-bladder disease is about three times more frequent in women than in men. It is recognized that infection through the blood stream is probably the essential cause of cholecystitis, but stagnation of bile is an important predisposing factor and this condition is more common in women because of pregnancy, tight clothing, constipation, obesity and lack of fresh air and exercise.

All the cases in my series were white patients. I have done a great deal of surgery on negroes in thirty years of clinical teaching and, while I have operated on two or three mulattoes for gall-bladder disease, as far as I can recall I have never had a case of cholecystitis in a full blooded negro. Dr. Liek, of Dantzic, has recently written to find the relative frequency of gall-stones in the white and colored races in America and stated that the Germans have found practically no gall-bladder disease in the negroes in Africa. Dr. Phemister, of Chicago, referred the question to me among other Southern surgeons and in a second letter told me that the replies received showed that the disease was very rare in the colored race.

Some years ago I discussed the question of the frequency of cholecystitis and appendicitis in negroes with Dr. Wm. J. Mayo and I stated to him I had never seen a case of gall-bladder disease in a black patient. Dr. Mayo laughed and said that practically the only operations he had ever done on negroes had been for gall-bladder trouble. The explanation of the difference in our experiences may be the fact that Dr. Mayo's negro patients probably came from Chicago, while mine came largely from rural communities. I believe the Southern negro's fine teeth and immunity to diseases of the gall-bladder and the appendix are due to his good digestion. With changing conditions this will pass, and he will eventually acquire all the susceptibilities of our so-called modern civilization.

In the series of cases I now report gall-stones were present in seventy-four per cent of cases and absent in twenty-six per cent of cases. For some reason it is always gratifying to a patient and the family to learn after an operation that gall-stones had been found and removed. The larger the stone or the greater the number, the more the satisfaction. The surgeon, however, knows that the formation of gall-stones is merely an incident associated with gall-bladder infection. It is a fact that some of the most obviously diseased gall-bladders I have ever removed or drained contained no stones.

No one questions the propriety of removing a diseased gall-bladder although it contains no stones but what should be done if in operating on a supposed case of gall-bladder disease the surgeons finds, in the words of Willy

*Read at fifty-fourth annual meeting of Medical Society of Virginia held in Roanoke, October, 16-19, 1923.

Myers, "a seemingly normal, soft, bluish and glistening organ not harboring stones or presenting any adhesions whatever?" All of us have had such embarrassing experiences. In my early work I frequently contented myself in such cases with removing the appendix if it was present and closing the abdomen. Most of these patients did not get permanently better, thus justifying my diagnostic ability while condemning my surgical judgment. With increasing experience, and, fortified by the practice of my surgical friends, I now unhesitatingly remove these apparently innocent gall-bladders, provided the patient's clinical history points to gall-bladder disease, the search of the abdomen reveals no other cause for the symptoms, and the preliminary examination of the patient has excluded the possibility of stones in the urinary tract or other extra-abdominal conditions which might lead to error. As previously stated, in certain cases I have had cause to regret not removing an apparently normal gall-bladder and, since I have become more radical, whatever compunctions of conscience I may have felt at the operation table have been relieved by examination of the specimen in the laboratory, where small stones that could not be palpated were found or unquestioned evidences of infection were demonstrated.

My records in the series of cases reported do not show what percentage of patients were classed as acute and what per cent were classed as chronic at the time of admission to the hospital. They do show that only five per cent were acute at the time of operation. Many cases that were acute on admission were treated medically and classed as chronic at the time of operation. These figures bring up the very important question of when to operate in acute cases. This question has been settled for appendicitis, but not for cholecystitis. Will it be safer in an acute case to treat the patient medically until the virulency of the infection subsides and an operation can be done under more favorable conditions, or will it be better to operate at once and relieve pain, stop septic absorption and remove the danger of gangrene and perforation? Unfortunately, I have no figures that will help to settle this question. I can remember scores of acute cases that were kept in the hospital under medical treatment for one or two weeks and then safely operated on when the disease was quiescent.

I can remember others whose symptoms were so urgent that an immediate operation was done and whose lives were undoubtedly saved by prompt intervention. On the other hand, I recall patients who apparently died because of delay who might have recovered if they had been promptly operated on, and others who apparently died because of undue haste who might have recovered if they had been first treated medically. There ought to be some general rule to guide us in these cases, but at present there is none, and the best a surgeon can do is to settle the question to the best of his ability in each individual case. Personally, I do not believe that infection of the gall-bladder presents an emergency at all comparable to infection of the appendix and, unless a case of cholecystitis is attended by symptoms that cause alarm, I am in favor of waiting until the acuteness of the infection subsides.

An analysis of the operations reported in this paper shows that the gall-bladder was drained in sixty-three per cent and removed in thirty-seven per cent of the cases. The series covers the work of twenty years, and in the first part of this period practically all the gall-bladders were drained, while in the last few years practically all of them were removed. The change from an almost routine cholecystostomy to an almost routine cholecystectomy was based not only on the altered opinion of the surgical profession but on personal experience as well. Cholecystectomy is certainly a more difficult operation to perform than cholecystostomy and at first it was hard to believe that it could be done with less risk to life, and that the patient would suffer no bad results from the sacrifice of the organ. With a little experience, however, I found the operation comparatively simple and safe. Convalescence was quicker and freer from complication and, most important of all, the patients remained well. My figures showed that eight per cent of the cases whose gall-bladder had been drained came back to the hospital for a second operation, owing to persistent fistulae, recurrence of gall-stones or symptoms due to adhesions, while practically all of the patients whose gall-bladders had been removed remained permanently well. I now do a cholecystectomy on all patients except those in which I drain for secondary pancreatitis, those whose general condition is so

bal from sepsis, cholemia or other causes that they will only bear the gentlest and quickest procedure, and those in which the gall-bladder and adjacent structures are so acutely infected that it seems safer to drain as a preliminary operation. Patients who are drained are warned that they may have further trouble and many of them are operated on a second time and the gall bladder removed before they leave the hospital.

Much has been written by the advocates and opponents of cholecystectomy with reference to the functions of the gall-bladder and the results of its removal. Few believe that the gall-bladder is important as a reservoir for bile as the amount it is capable of storing is small compared with the total secretion of the liver. Some attach importance to the fact that the composition of the bile in the gall-bladder varies from that secreted by the liver, in as much as it is more concentrated and contains a larger amount of mucus. Other writers believe the gall-bladder acts as a tension bulb, like the air chamber to a fire engine, to regulate the flow of the stream. It has been observed that after the removal of the gall-bladder there is a dilatation of the hepatic, the common and the stump of the cystic ducts, and this is thought to be an effort of nature to compensate for the loss of the gall-bladder. Bile pressure is dependent on the force of the secretion of bile by the liver and the resistance to the escape of bile by the sphincter muscle at the ampulla. The gall-bladder may act as a tension bulb to regulate the inequalities of bile pressure but, even if this is the case, its function is not a vital one, as proved by the large army of people who are well and happy despite the removal of the organ.

The average mortality of all the operations on which this report is based was 6.7 per cent. This is not high considering the fact that many of the patients were operated on during a period when surgery was not resorted to except as a last resort and at a time when present methods of technique were as yet undeveloped. The group of cases that showed the highest mortality were those with stones in the common duct where the death rate was ten per cent. The group showing the lowest mortality were the more recent cholecystectomies whose death rate was 2.7 per cent. As I look back over my results I am impressed by the fact, so often stated by so many men

with reference to operations for so many diseases and conditions, namely, that early surgery is easy and safe and that late surgery is difficult and dangerous. This is especially true in gall-bladder disease. There is no such thing as innocent gall-stones. They all in time will give trouble and if the patient lives long enough will require operation. If an operation has to be done sooner or later, then the sooner the better. Every conscientious practitioner, when called on to consider whether or not to send a patient with gall-bladder disease to a hospital, should answer the question made familiar by a popular advertisement, "If eventually, why not now?"

The symptoms of gall stones are familiar to all of you and I will not weary you by dwelling upon them. The most important are the following:

Indigestion, not produced by imprudence in eating, coming on without definite relation to taking food and usually relieved by eructation or vomiting; *pain*, located in the epigastrium and radiating to the back or right shoulder blade; *tenderness* over the gall-bladder elicited by deep pressure; *colic*, abrupt in its onset, sudden in its relief; *jaundice*, occurring on an average of once in seven cases and more often due to cancer than to gall-stones; fever seen during acute exacerbations of infection and characterized by rapid rise and fall of temperature.

At one time it was thought that the irritation of gall stones almost invariably increased the acid contents of the stomach. It has been learned, however, that hypochlorhydria is as frequently found accompanying the condition as hyperchlorhydria and I now no longer place any confidence in the result of gastric analysis, except in excluding other conditions.

The value of X-ray findings is still a question under discussion. Gall-stones are not calcareous substance but are composed chiefly of fat, as can be proved by subjecting one to the heat of an open flame when it will soften and burn much like sealing wax. They do not cast a clear shadow as do urinary stones but are only visualized on the X-ray plate when they contain lime salts. Conscientious radiologists only claim to be able to show gall-stones in from thirty to fifty per cent of the cases where they are actually present. While a positive report is conclusive, a negative report in the words of Goldberg, "Don't mean anything."

Some X-ray men claim that a healthy gall-bladder does not show on the plate under ordinary conditions. Therefore, if a distinct shadow can be outlined, such gall-bladder should be considered diseased as its walls are thickened or its cavity filled with pathologic material. It is possible that the technique of pumping air into the peritoneal cavity will increase the value of the X-ray as a diagnostic help.

After the examinations have been completed to establish a diagnosis of cholecystitis, then an examination similar to that for life insurance should be made to see whether the patient is in condition for the operation. In addition to the usual test, the coagulation time of the blood should be taken, especially if jaundice is present. If the coagulation time is delayed, the patient should be given 5 c.c. of a ten per cent solution of calcium chloride intravenously for three successive days after the plan suggested by Walters of the Mayo Clinic.

If there are any evidences of myocardial weakness, a preliminary course of digitalis should be given. The evil of the old practice of purgation and starvation is now generally recognized by abdominal surgeons and should especially be avoided in these cases. This type of patients have usually had their intestinal tract thoroughly emptied by a dose of castor oil given before the X-ray examination, and all they need is a simple soap suds enema administered the morning of the operation. Food, especially of the carbohydrate type, should be given in as large quantities as the stomach will tolerate up to twelve hours before the operation and water should be forced up to the last moment. In debilitated cases it is often well to give a solution of glucose and soda before as well as after operation, by the Murphy drip method.

The patients are placed on the table in the simple horizontal position. I have tried various methods of angulation and many forms of pads or cushions under the back, but have given them up as they embarrass respiration and do not give better exposure.

The anesthetic I employ is gas-oxygen followed by ether. The use of the latter agent is necessary to produce the degree of relaxation required to examine viscera thoroughly without traumatism.

The incision I use is an upper right rectus

beginning at the margin of the ribs and extending down far enough to give an ample field for operation. In a case of doubt as to whether a patient has cholecystitis or appendicitis, I do not make an incision over the appendix and palpate the gall-bladder, but make the incision over the gall-bladder and hook up the appendix, thus being able to inspect both. After the abdomen is opened, before I palpate or inspect the gall-bladder, I make a complete examination of the other abdominal organs unless there is some strong contraindication for doing so. If the patient is a woman, I first carry my hand down to the pelvis and determine the condition of the uterus, tubes and ovaries. I next bring the cecum up into the incision and as a rule remove the appendix. After the cecum is returned, I draw out and inspect the stomach and duodenum. I then examine the head of the pancreas and finally palpate the common duct with my thumb above and two fingers below, noting the size of its caliber, the thickness of its walls, the presence or absence of stones and whether there is evidence of infection as shown by the enlargement of adjacent lymph nodes. Only after this general survey of the abdomen is completed do I yield to the temptation to examine the gall-bladder itself. When the gall-bladder is exposed, its size, color, thickness of its wall, amount of distention and character of adhesions should be noted. Pressure should be made to see if it will empty and careful palpation carried out to find whether or not it contains stones. If these facts are all accurately recorded and afterwards compared with the patient's clinical history and laboratory reports, much useful information will be learned. In a good many recent cases where patients gave history of having had their gall-bladder drained medically by the Lyons method and who had reports of the character of the fluid removed, I found gall-bladders that could not be emptied by mechanical pressure and whose contents were totally different from that the so-called test would lead one to expect.

I usually remove the gall-bladder by clamping, cutting and ligating the cystic duct and artery and dissecting it free from above downward. The raw surface resulting is covered by sewing the divided edges of peritoneum together and a drain of soft rubber tissue is placed in position. I drain all my cases be-

cause if the drain does no good, it does no harm and I believe it is safer for the patient. It certainly saves me anxiety and makes me sleep better.

1000 West Grace Street.

SOME PRACTICAL POINTS IN THE DIAGNOSIS AND TREATMENT OF GALL-BLADDER DISEASE.*

By W. LOWNDES PEPLE, M. D., Richmond, Va.
Surgeon to McGuire Clinic.

It is an interesting thing to watch the emergence of any particular disease out of doubt and obscurity, and see its position established with assurance and certainty.

Many of us remember the position of the diseased appendix twenty or twenty-five years ago; how good men waited for days and pondered over a diagnosis which the patient himself often makes today. And so it is with the gall-bladder. Free discussion and interchange of thoughts and observations is making this subject clearer and clearer to us all, as time goes on and opinion crystallizes.

I think, however, we are still far less accurate in our diagnoses in the upper abdomen than in the lower, but we are getting more and more accurate as each year goes by.

In my work as a clinical teacher in the Medical College of Virginia, it has been my custom to go over and over the points of the differential diagnosis of the diseases of the abdomen in an extremely elementary manner, and I still find this routine of self-questioning to be a very good way of approaching any case of right-sided abdominal disease.

If the thumb of the right hand is placed along the lower right costal margin, the palm and extended fingers will cover an area of turbulence and trouble which I have called the "Balkans of Surgery." In this small area covered by the breadth of a hand we have some of the most perplexing problems with which the physician and surgeon are called upon to deal. Here lie, from above downward, the pylorus, the duodenum, the gall-bladder, the right kidney, the appendix, and the right ovary and tube in the female.

I know of no better way of arriving at a correct diagnosis in an acute condition of the right abdomen than to have these five or six points always in mind, and to narrow them

down by a process of elimination until we are reasonably sure of indicting the one that is left.

First, let us remember that nothing is absolute in disease; people do not get sick according to the rules laid down by text-books; there are a myriad variations. It is, after all, the personal element, the alertness of the observer, that counts for accuracy and success in diagnosis. Let's forget books and causes and theories for a while, and take a case just as the country doctor sees him. We will say he has been curing tobacco and has been seized with a severe pain in his abdomen. We reach him some six hours later. What has he got? How are we to find out? What are we to do? Let's follow our plan.

Is it his *stomach*? What had he eaten? Has he vomited? Was there any blood in the vomitus? When did his bowels move last? Was there blood in his stool? Did the stool look black or tarry? Has he ever had an attack like this before? Did emptying his stomach relieve his pain? Did emptying his bowels relieve his pain? How old is he? Remember that ulcer of the stomach is far less frequent than ulcer of the duodenum and occurs in older people.

What is his temperature? What is his pulse rate? Is he shocked, or was he shocked when the attack came on? What is the character of his pain? Is it terrific, agonizing, so that two or more hypodermics of morphine are required to ease him? Is there a marked board-like rigidity that never relaxes?

What is it that happens to an ulcer to produce such a picture? It is perforation. How could one tell a perforation of the stomach or duodenum from a perforation of the gall bladder? You can't tell—unless you had determined beforehand from previous knowledge of the case that the patient already had gall-stones or an ulcer. It would make no difference anyway, for a hole in one hollow organ is as bad as a hole in another. Nature is about as apt to seal one as the other, and she does it far oftener than we have any right to ask it of her.

Before dismissing the stomach: Examine his lungs. Are both clear, front and back, and from top to bottom? Has he a diaphragmatic pleurisy? Always think of this and pneumonia.

The gall-bladder.—Practically speaking,

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there are two acute conditions of the gall-bladder which we must always bear in mind in such a case as we have outlined—inflammation of the gall-bladder, and stones in the gall-bladder. They may exist separately or together.

In cases of severe repeated attacks of pain without fever, if we can fix it on the gall-bladder, it is fair to reason that the condition is a mechanical one and is due to stone. If accompanied by fever, we know that inflammation is present, whether accompanied by stones or not. Gall-bladder pain and ulcer pain, gall-bladder tenderness and ulcer tenderness are so much alike that it is the patient's history that will be the determining factor in making a differential diagnosis.

The right kidney.—Always palpate the kidney with one hand in front and one over the kidney region in the back, and see if it is tender. A big, distended gall-bladder, or a high, post-cecal appendicular abscess may fool us to death, but not every time, so let's try every time.

Let's make a microscopic examination of the urine, always catheterized in the female, and in the absence of pus and blood we feel reasonably safe in excluding pyelitis and stone.

The appendix.—Any of the symptoms of appendicitis may be lacking in a given case. Every surgeon has operated for acute appendicitis when the trouble was in the gall-bladder or when an ulcer of the duodenum had perforated. We will doubtless make other similar mistakes. But, when we have fixed the responsibility on the appendix and turn over our symptoms; nausea, vomiting, pain, localized tenderness, fever, rapid pulse, rigidity—of all the symptoms enumerated, be over-careful in the absence of nausea or vomiting. If he has not been nauseated nor vomited, go over him a second or third time.

The right ovary and tube.—Always make a careful vaginal examination where there is any question at all. We can usually demonstrate an inflamed ovary or swollen tender adherent tube, or we can exclude it definitely from further consideration.

I have not stressed the laboratory side of our diagnostic work; but there are two invaluable aids which can be done so quickly that they should be in reach of all. They are a differential white blood count and a microscopic study of the urine. A high poly count

would exclude typhoid fever from our consideration; if very high, with a board-like rigidity, we might clinch a diagnosis of perforation and hasten surgical intervention. If a microscopic analysis will eliminate the kidney, it is well worth any time and trouble that may have been taken to make it; for, if we mistake an appendix for a gall-bladder, we remove the appendix and no harm is done, but we do not operate for pyelitis. It is most important to exclude or confirm it.

I have not taken up the question of X-ray. We would not resort to it, of course, in acute cases, if we had it at hand. But it is invaluable in chronic or interval cases. In skilled hands about eighty per cent of ulcer cases can be demonstrated by it. A negative X-ray for gall-stones means nothing, for shadows are gotten in a very small proportion of cases when stones of even considerable size exist.

In all cases great care should be used in getting an accurate history, and nothing so conduces to accuracy as writing the history down. One gets the dates, facts, and the logical sequence of events then clearly fixed in the mind and, if memory fails us later, it is all there on paper. The history of indigestion and flatulence is important; the effect of taking of food on the attacks.

Many people with gall-stones have eliminated one article of diet after another, until they scarcely have enough to sustain them. Ulcer people, and especially duodenal ulcer, will usually tell us that food relieves their pain, or that the pain is worse just before meals when the stomach is empty. Some have formed the milk and cracker lunch habit, to stop these hunger pains. Ulcer people almost all take soda, because it gives them relief. So much is this true that soda-taking should be regarded as a symptom. Gall-bladder people are not soda eaters, though some use it to help get the gas from their stomachs, getting a measure of relief in this way.

Gall-bladder pain goes through to the shoulder; but ulcer pain may do this also. It is the relation of pain to eating that gives us the differential clue. The tenderness and pain is about in the same locality for both. And remember the gall-bladder and pylorus are not at fixed points up under the margin of the ribs, but are often on a level with the umbilicus.

Jaundice is found in so small a proportion of cases that we do not lay stress upon it. If

present, it points very definitely to the gall tract, and means mechanical, inflammatory, or malignant obstruction.

When we have decided that the case in hand is not one of simple indigestion, what is the best and safest thing to do, pending operation? Avoid the use of purgatives. Purgatives promote peristalsis, and peristalsis promotes perforation and tends to spread inflammation. Empty both ends of the gastro-intestinal canal and splint the middle segment. The stomach tube above; the enema tip below; splint the middle with small doses of morphine at regular intervals. If one-eighth grain is given every four hours, it will give better results than a larger dose given only after suffering has become acute, and in the end less of the drug will have been given.

To continue with our patient: let us say we have made out our case and opened the abdomen and found our diagnosis is correct. We have gall-stones and cholecystitis. What shall we do?

Of course, we assume that a man who would open the abdomen is prepared to do anything that may be called for by conditions as they present themselves. There is in my judgment too great a tendency now-a-days to "follow the leader;" to go in pre-determined to follow this or that particular plan. It is a question that requires sane judgment in the individual case. I have seen gall-bladders removed, with which I could see nothing wrong. I have left in gall-bladders that I know ought to have come out. I have done so deliberately, because I believed that in the case in question removal was a far more hazardous operation than simple drainage. No one should be ashamed to do a second operation for the removal of a gall-bladder that he has previously drained.

To briefly summarize: a gall-bladder with thin walls, not diseased but containing stones, may be opened, the stones removed, and the opening sutured and the gall-bladder dropped back without drainage, as emphasized in a paper by Dr. Willis.

The gall-bladder, if containing pus but with walls but little affected, may be drained with the assurance of a very fair proportion of permanently good results: and, by this, I mean cured patients.

The gall-bladder, if greatly thickened and atrophied, or tremendously distended, or if gangrenous, should be removed. If, however,

the technical difficulties are very great and a prolonged operation would prove dangerous, if there is profuse capillary hemorrhage when adhesions are separated, one should drain and quit; and be no more ashamed of it than of the first step in a two-stage prostatectomy.

The best operator is not always the best surgeon. A good surgeon should have the courage to do as much or as little as is necessary, to get his patient well.

1000 West Grace Street.

DISCUSSIONS OF PAPERS BY DRs. McGUIRE AND PEPLE.

DR. A. MURAT WILLIS, Richmond: The relative proportion of the cases of calculous and non-calculous cholecystitis is of much importance. If Dr. McGuire has removed one thousand gall-bladders in twenty years and twenty-six per cent of these were instances of non-calculous cholecystitis, it would be interesting to learn what percentage of non-calculous cases has occurred in the past five years, since he has come to direct more attention to the condition. From one of the great clinics of this country, there was recently reported a series of 500 cases of cholecystectomy, ten per cent of this number being instances of non-calculous cholecystitis. Of the gall-bladders removed from the patients suffering from "non-calculous cholecystitis," thirty-three per cent were found to be normal on histological examination, and the subsequent history of the patients showed that no relief was obtained by the operation. From another great American clinic, a report came a few years ago, stating that forty per cent of all cholecystectomies were performed on patients suffering from non-calculous cholecystitis; and histological examination revealed that *all of these gall-bladders were diseased*. Such diverse reports as these suggest that there is something radically wrong somewhere.

Another point is whether it is safe to close the abdomen without drainage after cholecystectomy. If we *must*, on the basis of obscure digestive disturbances for which we can find no other clear cause remove a gall-bladder, is it necessary to introduce a drain? We may be reasonably sure of furnishing the patient with an adequate cause for his subsequent symptoms, for our drain will inevitably introduce infection and lead to formation of adhesions. Naturally, there are instances where one should hesitate to omit drainage after cholecystectomy, but, as I pointed out years ago, in many cases, its omission results in a more rapid and less uncomfortable convalescence with less likelihood of post-operative complications. My attitude receives support from the experience of operators at the Mayo Clinic; two thousand cholecystectomies without drainage have been performed there recently. Dr. McGuire sleeps better when he employs drainage; he will find that his patients will sleep better if he omits it in suitable cases; they will have a smoother convalescence; and the dangers of post-operative adhesions and hernia are lessened.

DR. McGUIRE, in closing: The paper I read discussed many unsettled questions and contained the expression of many positive opinions; therefore, I expected more criticisms than I received.

DR. WILLIS speaks as if there were two distinct forms of gall-bladder disease, cholecystitis with stone and cholecystitis without stone. I think there is but one form. If infection of the gall-bladder occurs, then cholecystitis results and a stone may or

may not form. A gall stone is not the cause of cholecystitis, but a result of the disease. It is purely an incident in the pathologic process. In operating for gall bladder disease, I am not influenced by the presence or absence of gall-stones; I am interested in the condition of the gall-bladder itself. As I stated in my paper the worst gall-bladders I have ever removed or drained contained no stones.

I do not advocate removing innocent gall-bladders, but some gall-bladders look innocent when they are really diseased and cause symptoms. When a patient has symptoms which clearly point to the gall-bladder and when the preliminary examination and the exploration at operation fail to show any other cause for the symptoms, then I would remove an apparently innocent gall-bladder on suspicion. This suspicion will be confirmed nine times out of ten by the laboratory examination of the specimen.

Finally, with reference to drainage: I do not drain cases because it makes me sleep better, but it makes me sleep better to drain cases, because I am sure it is safer for the patient.

Despite the greatest care in ligating the duct and controlling bleeding, I continue to have biliary drainage in a certain proportion of the cases I operate on. Although I have studied these cases carefully, I am unable to explain the cause or to predict under what conditions it is most likely to occur. I therefore drain all cases in order to protect the few who need it. I use a strip of soft rubber tissue, which does no harm if it does no good.

DR. PEPLE, in closing: I have nothing to add except that I think we should not fall into a routine. We should consider each case on its own merits. The gall-bladder is there for a very definite purpose, and it should not be removed without definite indications for so doing.

The easier, quicker convalescence of the cholecystectomy over the cholecystostomy cases probably tempts us to do the latter too often.

As for drainage, I have not yet gotten to the point of feeling safe in closing a cholecystectomy without drainage.

GONORRHEAL ARTHRITIS.*

By WILLIAM A. SHEPHERD, M. D.,

Associate in Medicine, Medical College of Virginia,

and

BERNHARD STEINBERG, M. D.,

Resident Physician, St. Philip Hospital,
Richmond, Va.

A comparatively short time ago, Rosenau called attention to focal infection as a potent factor in disease. Since then, we have come to realize that teeth and tonsils are responsible for a great many ills, but in the general onslaught on these members, the genital tract has been to some extent overlooked. Consequently, in many instances the true focus remained undiscovered and untreated. Arthritis as a sequel to gonorrheal infection of the genital tract is a rather common occurrence. Its prevalence and gravity justify a more careful consideration. This communication is intended to present a general resumé of the subject of

gonorrheal arthritis, its various manifestations, methods of diagnosis, and treatment.

There is evidence that the gonococcus was considered a possible cause of arthritis long before Lindermann¹ in 1892 demonstrated its presence in diseased joints. However, his demonstration does not seem to have been very convincing since Sternberg² writing in 1896 discredits the claim and Strümpell³ in 1897 dismisses the subject with scant attention. In 1896, Thayer and Blumer⁴ found the gonococcus in blood culture, thus indicating a possible route of joint infection. In recent years, many investigators have demonstrated the gonococcus in joints, establishing its position as the etiological factor in the disease. However, very little interest has been shown in gonorrheal arthritis and very slight progress made in its diagnosis and treatment, as evidenced by the meagre literature on the subject, especially in this country.

Etiology.—Arthritis is the most serious complication of gonorrhea. It destroys tissue and produces ankylosis. It shows a marked tendency to recur and commonly results in endocarditis. Approximately five per cent of all cases of genital gonorrhea are complicated by obvious arthritis. Many more cases presenting less striking symptoms are either neglected or entirely overlooked. It is interesting to note that typical cases of arthritis may result from infection of the eye⁵ and even of the finger.

Metastasis to the joints usually occurs in the acute stage of the primary infection, although it may occur in any stage.⁶ During an acute urethritis, the patient may altogether escape arthritis, only to have an attack in the chronic or latent stages. Recurrent attacks are prone to be of increasing severity. Frequently, especially in women, there is no concurrent evidence, clinical or otherwise, of uro-genital infection. In such instances the diagnosis rests upon the demonstration of the organism in the joints.

Young adults show the greatest susceptibility to gonorrheal arthritis, although practically no age is exempt. It has been observed in children under ten.⁷ Certain observers (Northrup⁸, Norris⁹) claim a greater incidence in males, but in dispensary and hospital where both sexes are represented, we have observed practically an equal proportion in females. The colored race in this country is especially susceptible to the disease. No joint is immune

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to the infection but the most commonly involved is the knee. The order of incidence in other joints is as follows: ankle, wrist, digits, elbow, shoulder, hip, tempormaxillary, metatarsal, sacroiliac, sternoclavicular, chondrocostal, intervertebral, cricoarytenoid, tibiofibular.¹⁰ The condition is usually monoarticular, but two or more joints may be affected simultaneously or in rapid succession.

Pathology.—Except for the peculiar tendency to production of osteoporosis¹¹ and greater disposition to ankylosis, the pathology of gonococcal arthritis does not differ materially from that produced by other organisms. The inflammation is not confined to the articular surfaces but spreads along the tendon sheaths and adjacent periosteum, giving to the joint a fusiform appearance. Instead of affecting the articular surfaces, the inflammation may be confined to the soft tissues around the joint; in which event the capsule contains an accumulation of cloudy, serous or sero-fibrinous fluid with few leucocytes and gonococci may or may not be present. Infection of the articular surfaces and synovial membrane results more commonly in a thick, cloudy fluid, showing many leucocytes and usually the gonococcus in pure culture or associated with other pyogenic organisms, especially staphylococcus and streptococcus. Roughening of the articular surfaces with calcareous deposits may result. Adhesions may form between the surfaces, producing ankylosis. A less marked limitation of motion follows fibrous overgrowth when the infection is confined to the soft tissues around the joint.

Symptomatology.—Gonorrheal arthritis presents itself in various forms, and it is difficult to differentiate them sharply. A subacute or chronic case of uro-genital gonorrhea may be attended by lightning-like pains with only slight joint inflammation or no clinical evidence at all. Osler has called these attacks arthralgic. Except for these fleeting pains, the patient is free from symptoms. This form of arthritis is as commonly met with as it is commonly unrecognized. Occasionally, the patient experiences sharp pains along the course of a tendon or over a bursa but presents no evident pathological changes or constitutional disturbance. In the chronic form of arthritis, when exostoses occur on the os calcis, what is known as "painful heel" results.

The type next in severity is the single joint,

usually the knee, distended with a serous effusion. The joint is inflamed, painful, and motion is limited. There is a tendency to chronicity in so far as the fluid is apt to remain for a prolonged period of time. In this type there may be a slight elevation of temperature, but generally there are no constitutional symptoms.

The most virulent type of gonorrheal arthritis resembles an acute attack of rheumatic fever. It usually attacks several joints in rapid succession. Its sudden onset with a rise of temperature to 103° F. and prostration is suggestive of a septicemia. The joint is hot, swollen, distended with fluid, extremely tender and has a fusiform appearance. The slightest motion produces excruciating pain. While the joint is at rest, there is only slight discomfort. The effusion is in the joint as well as in the surrounding tissues. Occasionally, the periosteum and the bursae are involved. Ankylosis may follow one of these acute attacks. Usually as soon as one joint subsides, another flares up.

During or closely following the joint attack a cardiac murmur may appear. With the progress of the disease, the murmur becomes more pronounced until it can be heard all over the precordia, indicating the presence of an acute endocarditis. Septicemia may set in with a sudden rise of temperature to 105° F. accompanied by chills, sweating, and extreme prostration. The prognosis is grave, such cases usually terminating fatally. However, neither the onset or the entire attack may be so severe. Although the acute joint may be present, neither symptoms of valvular lesion nor septicemia may follow, yet recurrent attacks always predispose the patient to these dangers.

Diagnosis.—Definite diagnosis rests upon the finding of the gonococcus in the aspirated fluid. This procedure first employed by Lindermann (loc. cit.) has not been generally adopted by the profession. Apparently, there is a manifest hesitancy to puncture the joint for diagnostic purposes, due, perhaps, to a fear of producing a mixed infection. Under ordinary precautions this danger is negligible, and the procedure should be more commonly employed. The technique offers no special difficulties, produces but slight discomfort, and is not apt to result in any complication. After preparing the part with iodine, a sterile No.

20 needle attached to a glass syringe is thrust vertically through the most dependent part of the joint into the space between the articular surfaces. If no fluid is obtained at first, the direction of the needle may be changed or reinserted at another point. Novocain, one per cent, may or may not be used depending upon the patient.

It is evident that the history of a previous infection must be elicited. The uro-genital tract should be investigated with great care for presence of gonococci and gonorrheal lesions. In the presence of a positive history or of definite lesions, suspicion of joint involvement is aroused if the patient has shooting pains in the joints or along the tendons, or stiffness with or without pain, even though there is no inflammatory reaction. The purulent joint gives a leucocyte blood count of 12,000 to 20,000. There is no record of any observation bearing on the occurrence of leucocytosis in the other forms of gonorrheal arthritis. The complement fixation test is a great aid in diagnosis. Kolmer¹² states that the reaction is positive in eighty per cent to 100 per cent of all cases, when using a polyvalent antigen.

X-ray offers but little aid in diagnosis. A. L. Gray (personal communication) states that in acute cases there is nothing characteristic except for the evidence of a diffuse arthritis. If, in a chronic case, there is ankylosis of the patella to the femur, the case is very apt to be of gonorrheal origin, particularly if there are at the same time spurs on the os calcis.

Differential Diagnosis.—It is evident that gonorrheal arthritis closely simulates other common conditions. In absence of definite findings, the differentiation is often difficult. In acute articular rheumatism the fever is higher, sweating and prostration are more pronounced. The joints are apt to be more sensitive and usually several are attacked simultaneously. Puncture of the joint commonly shows the streptococcus. Gout, in this country, is relatively uncommon; it shows evidences elsewhere such as tophi and arterioscleroses, and usually affects one joint. Arthritis deformans shows peculiar deformities as a result of osteophytic processes. Polyarthritis chronica villosa occurs in women at menopause and in children; the disease is of long duration, pain is severe and independent of motion. What is known

as "chronic rheumatism" is characterized by absence of acute manifestations, its slow progress and its occurrence in middle and old age. This condition is probably infrequently of gonorrheal origin. Tubercular joints are common in children. The symptoms and X-ray clear the diagnosis promptly. In Charcot's joint, absence of pain, symptoms of tabes dorsalis and X-ray serve to differentiate. In neuritis the nerve trunk itself is sensitive to pressure, the pain is boring, follows the course of a nerve, and usually the attack can be traced to some etiological factor, such as infectious disease, or organic poisons.

Treatment.—In an acute case, the patient should be put to bed, given a light, nourishing diet and plenty of water. The affected joint should be immobilized. Pain may be alleviated by local application of ice and full doses of salicylates. A tonic of iron and arsenic is advantageous later on. When the acute stage subsides, moderate exercise of the joint should be employed. If a coincident urogenital infection exists, it should be vigorously treated and, if necessary, surgery resorted to. Cunningham¹³ advises removal of seminal vesicles. Little can be done locally for the arthralgic pains; eradication of the urogenital focus and systemic treatment are the only methods of use. Hot air treatment of the painful bursae and tendons may be tried. In the painful heel the surgical removal of the exostoses is recommended. In the joint with serous effusion without acute symptoms, aspiration of the fluid, tight bandaging and systemic treatment with attention to the genital focus is a logical procedure. Incision and irrigation of the purulent joint has been practiced but this procedure seems needlessly radical. Potassium iodide, salicylates, hot air, thermocautery, blistering are of little avail except for alleviation of symptoms.

Antigonococcic Serum.—The first attempt at specific therapy of gonorrheal arthritis seems to have been made in 1907 by J. C. Torrey, working in the Loomis Research Laboratory; Torrey injected intramuscularly 2 cc. of the serum for 3 or 4 days and a complete cure was apparently obtained; later he increased the dosage from 36 to 45 cc., giving 12 to 15 cc. daily for 3 days with good results. In 1919, Debre and Paraf¹⁴ punctured joints in 15 patients with different types of gonorrheal arthritis and injected the serum in place of the

evacuated effusion; in six cases the cure was complete in less than 8 days, while eight cases were cured within 15 days. Later, others reported success with serum injection. Results with the gonococcus serum are not uniform; nevertheless, it is a valuable remedy and should be more commonly employed. This serum has been available for some time in 5 cc. ampules; it should be given in acute cases in doses of 15 cc. intramuscularly on 3 consecutive days. Injection of foreign proteins is of doubtful value in acute cases and of no value at all in chronic cases.

Sensitized vaccine was employed first by Besredka in 1902 and proved to be of some benefit. Howorth¹⁵, Cole and Meakens¹⁶, Rogers and Torrey¹⁷ find vaccine therapy of value and this has proved true in our experience. Vaccine may be given in acute or chronic stages, small doses of 10 million cocci in acute and 50 million in subacute, every five days. It is advantageous to increase the dosage gradually, beginning with 25 million cocci, increasing by 5 million daily or every other day up to 550 million. In diabetes, carcinoma, advanced nephritis, and other debilitating diseases the use of vaccines is contraindicated.

Defour and Debre¹⁸ aspirated joints and, without heating or sterilizing the fluid, injected it subcutaneously and report good results from this procedure. Ballenger and Elder¹⁹ state that in order to obtain satisfactory results the synovial fluid must be infected and purulent. They used 15 to 20 cc. of the fluid every 2 to 7 days.

Ross²⁰ employed 10 to 20 cc. of electrargol intravenously every second day and reported very striking results. In one case herewith reported we aspirated 20 cc. of fluid from the joint and replaced it with 25 cc. of 5% argyrol, with the result that other affected joints subsided and there were other evidences of systemic action.

CASE REPORTS.

On account of its typical character and especially interesting features, the following case is reported in detail.

Case 1. F. C., colored, female, age 18. Three years ago the patient had an attack of gonorrhea attended by acute symptoms in right knee and metatarsal joints. At intervals, since then, she has had 4 early joint attacks involving hip, intervertebral, temporo-mandibular,

wrist, and metacarpal joints. The present attack began four days ago with swelling of right shoulder and left elbow joints. They became distended with fluid, extremely painful, and motion was limited. The metatarsal and lumbar intervertebral joints are painful but not swollen. She has a sore throat. There is a faint systolic murmur at the apex transmitted to axilla; cryptic, hypertrophic tonsils; fever of 102° F. She gives a history of dysmenorrhea and leucorrhea. Her Wassermann, blood culture, urine, cervical, urethral and vaginal smears are negative. On day of admission, leucocytes—13,500; 6 days later the leucocytes increased to 24,800. Six days after admission, 20 cc. of a cloudy, straw-colored fluid was withdrawn by puncture from the right shoulder. Microscopic examination revealed abundant pus cells and intracellular diplococci. The pain in the shoulder was relieved by the puncture. On the following day, 1125 million cocci of polyvalent gonorrheal vaccine was administered intravenously with increased doses every other day. A week later, another 30 cc. of cloudy fluid was withdrawn from the shoulder and 25 cc. of 5% argyrol was injected. In 4 hours the temperature rose from 101° F. to 105.6° F. She had been running a fever between 101° F. and 104.6° F. On the following day the temperature came down to 100.6° F.; on the second day to 98.8° F. and gradually returned to normal. Three days after the argyrol injection, the left elbow was absolutely normal and the pain in the intervertebral and metatarsal joints gone. The shoulder joint remained distended for 14 days, at the end of which time the joint returned to normal; by that time the cardiac murmur was very faint and confined to the apex. In the meantime, the genital infection was treated. She was discharged as cured.

Case 2. M. J., colored female, 36. Two weeks before the right knee began to swell, the joint was red, painful and limited in motion. On admission, the joint is distended with effusion, slightly tender, no inflammation. She gives a history of pain in the lower abdomen, leucorrhea, dysmenorrhea, and shooting pains in other joints. Tonsils atrophic, teeth in good condition. Cervical, vaginal and urethral smear negative. Twenty-five cc. of clear yellowish fluid was withdrawn from joint; no organisms found. The knee was tightly bandaged and she was given increasing doses

of vaccine. In a week she was discharged as improved and referred to the gynecological dispensary for treatment of the genital infection.

Case 3. M. F., colored female, 19. Married 3 years ago; since then had pain in lower abdomen, dysmenorrhea, menorrhagia, leucorrhea and, within the last month, she had pain in knee, elbow and ankle joints with slight swelling. Wassermann 3 plus, no gonococci in smears. A double salpingectomy was performed on her. Previous to the operation she was given vaccine treatment. She made an uneventful recovery and was discharged as cured.

Case 4. J. H., colored male, 22. Four weeks ago the patient had an acute attack of gonorrheal urethritis which subsided in two weeks. Immediately after the cessation of the urethral discharge, the right elbow joint became swollen, painful and motion was limited. The patient was seen two weeks after the elbow was involved. The joint had a fusiform appearance, swollen, flexed at an angle of 35° and extremely painful to slightest motion. Temperature 99.8°. Patient complained of headache and malaise. Physical examination otherwise negative. X-ray showed no bone lesion. A joint puncture was done and a small amount of cloudy fluid withdrawn: a smear demonstrated intracellular diplococci. Ten cc. of 5% argyrol was injected into the joint. In two days, the patient's physical condition was improved, the joint pain subsided and, within one week after injection, the swelling almost entirely subsided, motion returned to normal and pain was entirely gone. He was referred to the genito-urinary department for treatment of the urethral condition.

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DISCUSSION

DR. H. S. HEDGES, Charlottesville: Just one word about eye complications which are by no means uncommon in chronic sub-acute gonorrhea. In all cases very much violent pain is suffered, which is sometimes so severe that it is hardly controlled by morphine. Sensitized and autogenous vaccines have been used and have given some of the most brilliant results.

DR. M. PIERCE RUCKER, Richmond: This is a very important subject. No age is immune. Dr. Royston has recently reported one case in the new born which showed no evidence of surface infection. He thinks that it was undoubtedly transmitted through the placenta. The infant had involvement of the knees and elbows and, later, ankylosis of the jaw. In the fluid that was aspirated, gonococci were demonstrated—a very interesting observation.

I have never seen a case in a new born, but have seen several mothers with gonorrheal infection in the puerperium.

THE CONCURRENT OCCURRENCE OF TUBERCULOSIS AND ASTHMA.*

By GERALD A. EZEKIEL, M. D., Richmond, Va.

Member of Richmond Tuberculosis Dispensary Staff; Associate Visiting Physician to Pine Camp Hospital.

We were taught in the medical colleges fifteen years ago that a patient with asthma never had tuberculosis. This belief is still held to be true by some physicians of today, and the effect of this teaching of the physicians of ten or more years ago is still fresh in the minds of the laity. I have asked a good many tuberculosis specialists, whom I have met, their views on this point, and they all tell me that they have seen the two conditions present at the same time, but that this common erroneous idea that they do not occur in conjunction does exist. The object of this paper is to com-

*Read at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

bat this fallacy and to try to establish the truth on this point. The need of this was forcibly presented to me by a patient of mine, an asthmatic, absolutely refusing X-ray examination, because a specialist in Philadelphia ten years ago told him that asthmatics never had tuberculosis.

The diagnosis of tuberculosis in conjunction with asthma is at times rather difficult, due to the alteration in breath sounds by the asthmatic breathing. The sibilant and sonorous rales of asthma render obscure and almost, if not entirely, inaudible the fine crepitant rales of an early or slight tubercular infection of the lungs.

In my experience, the diagnosis of the concurrent existence of these two conditions can be made most often by aid of the history, X-ray examination and bacteriological examination. I am giving a few case histories to illustrate the application of these points. In several of these cases the physical findings were either altogether negative, or else typical of bronchial asthma but, on account of a suggestive history, X-ray examination was ordered and gave definite positive results. To speak of the bacteriological examination in tuberculosis may seem trite. We all know a positive finding means tuberculosis without question and that a negative report does not necessarily rule out tuberculosis. I want to emphasize the need of repeated examinations before regarding a sputum as negative. I have received as many as eight negative reports and then on the ninth examination obtained a positive report.

Case No. 1158, November 6, 1919. E. P., white, male, age 8. Present illness began with bronchial trouble three years ago, now has fever, loss of weight, weakness, shortness of breath, dull pain in chest, cough, good deal of expectoration. Physical examination: Diminished expansion of chest, percussion note increased, few coarse rales left base. November 12, 1919, weight 48 $\frac{1}{4}$ pounds. Sputum: Negative. Provisional diagnosis was made of asthma and probable pulmonary tuberculosis. November, 1920, patient was placed in hospital for further observation. Weight 47 $\frac{1}{4}$ pounds (one year later.) Physical examination: Emphysematous breathing, sibilant rales throughout the chest. X-ray examination November 6, 1920, as follows: "Patient has a slight bronchial type of tuberculosis, involv-

ing both lungs. A good deal of this is well calcified but there are uncalcified tubercles seen in both lungs, chiefly the upper and lower right lobes and outward from the hilum in the left lung. There is a slight pleural thickening between the upper and middle lobes of the right lung. Each hilum contains a dilated bronchus." Sputum: Positive. Protein sensitization test: Reacted to egg and cabbage. Final diagnosis: Pulmonary tuberculosis and asthma.

Case No. 1299, October 25, 1922. Mrs. F. D., white, female, age 29. Present illness began with bronchitis ten years ago, now has night sweats, loss of weight, weakness, indigestion, shortness of breath, dull pain in chest, expectorates thick yellow mucus. Normal weight 190 pounds, present weight 161 $\frac{3}{4}$ pounds. Physical examination: Squeaking rales throughout the chest. Sputum: Negative. Wassermann: Negative. Provisional diagnosis: Asthma and pulmonary tuberculosis. X-ray examination November 24, 1920 as follows: "Patient has apparently a slight bronchial type of tuberculosis, chiefly in the middle lobe of the right lung. The bronchial branches in this lung and the structure in the right hilum are much thickened. Emphysematous areas are seen outward from right hilum." Final diagnosis: Pulmonary tuberculosis and asthma.

Case No. 1442, May 17, 1921. A. S., white, male, age 40. Present illness began four years ago with pain in chest, now has loss of weight, fever, weakness, indigestion, shortness of breath, cough, hemoptysis, and has had several hemorrhages. Physical examination: Lungs emphysematous and full of sibilant rales and rhonchi. Sputum: Negative. Wassermann: Negative. Provisional diagnosis: Bronchial asthma and tuberculosis. This patient was finally successfully X-rayed in July, 1921 with the following report: "Patient has a general fibrosis of all bronchial branches particularly on the right side. Numerous calcified tubercles are seen in both lungs. There is a group of uncalcified tubercles behind the second right interspace. There is a mass of scar tissue to the right of the heart extending from hilum to the diaphragm. The mediastinal pleura is thickened. Patient has a hypertension type of aortic arch. The top of the aorta reaches well below the sterno-clavicular joint. The heart and aorta are small. Conclusion: Patient has a fibroid phthisis. The marked scar tissue de-

posit to the right of the heart, extending outward from right hilum, is suggestive of a specific infection." Final diagnosis: Pulmonary tuberculosis, fibroid type, and asthma.

Case No. 1918, August 17, 1922. Mrs. V. C., white, female, age 26. Gave history of having had asthma the last twenty-one years. Present illness, asthma for last two months, tires easily, loss of weight, night sweats, cough, expectorates a great deal of greenish yellow sputum. Normal weight 102 pounds, present weight 91 pounds. Physical examination: Few rales in right upper lobe, hypertrophied tonsils. Sputum: Negative. X-ray report September 2, 1922, as follows: "General thickening of all bronchial branches. A few well calcified tubercles are seen in each lung. Patient has had pleurisy on the left side resulting in a pleural adhesion at the left costophrenic angle. There is no evidence of recent unhealed, clinical tuberculosis." Provisional diagnosis: Asthma and pulmonary tuberculosis. This patient's tonsils were removed and she was given sanatorium treatment. Final diagnosis, April 26, 1923: Chronic pulmonary tuberculosis arrested, and asthma. At this time she weighed 124 pounds, a gain of 33 pounds and was doing nicely.

I might at this point explain that the provisional diagnosis is made at the time of the first examination of the patient. An attempt is made to form an opinion of the case, so as to have a working diagnosis. In the first case cited, provisional diagnosis was made and one year later confirmed by X-ray and sputum examination. Up to this time the sputum had been negative. In the second, third, and fourth cases the diagnosis was confirmed by X-ray examination. Positive sputum was never obtained in these three cases but the X-ray findings, with the history and physical findings of these cases and the outcome, bear out the diagnosis as made. I could give some additional similar case histories, but these few are typical of the point I wish to make, that is, X-ray and sputum examinations will enable you to properly interpret and confirm an otherwise obscure or questionable diagnosis of tuberculosis and asthma occurring concurrently.

In making the provisional diagnosis, asthma was placed first. This was usually the disease condition that caused the patient to seek medical advice. In making the final diagnosis, pulmonary tuberculosis was placed first, because

this seemed to be the main condition to be treated and certainly the more important. It is possible the asthma is super-imposed upon a tuberculosis due to a protein sensitization to tubercle bacilli. I have not had the opportunity to study this point sufficiently to make any definite statements at this time, but merely mention this as a possibility and a point that I hope to be able to investigate later.

1652 West Grace Street.

THE BLOOD CULTURE AS A DIAGNOSTIC AID.*

By AUBREY H. STRAUS, M. A., Richmond, Va.

We have all heard of people who claim to have had typhoid fever more than once. We have also probably met physicians who claim to have treated typhoid fever two, or even three, times in the same person. I have never heard of a case, however, in which there has been laboratory proof of typhoid fever occurring more than once in the same person.

I cannot, of course, undertake to say that such a thing is impossible, but I do regard it as most unusual. The true explanation of these occurrences, in all probability, is the fact that there are quite a variety of bacteria which may occur in cases of enteric fever. Clinically, the infection caused by many of these organisms is identical with true typhoid fever.

Many such organisms are known and there are doubtless others not yet described. In Table I we have summed up all our blood culture work, showing a large variety of findings. Yet there are many organisms described by others which we have never encountered.

The figures in Table I are of considerable interest in showing how great the variety of such infections may be. The rapidly increasing use of the blood culture has made this table possible and will, in future, doubtless disclose a still greater range of infections than those so far found.

While the physicians of Richmond have made use of the blood culture for many years, it is only during the last year that it has begun to come into general use in the rural sections. With the further simplification set forth in this paper we hope to see its use extended.

*From the Laboratories of the State Board of Health and the Richmond Health Bureau.
Read at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

TABLE I.

SUMMARY OF BLOOD CULTURES EXAMINED.

Result	Number	Per Cent
Positive -----	249	22
Negative -----	881	78
Total -----	1,130	100

The positive results were as follows:

FIRST GROUP.

Organisms Causing Infection Clinically Resembling Typhoid^A Fever.

B. Typhosus -----	217
B. Para-typhosus B. -----	6
B. Coli -----	6
Unidentified Bacilli Resembling Para-typhoid--	2
B. Fecalis Alkaligenes -----	1
Bacillus resembling B. Asiaticus -----	1
Friedlander's Bacillus -----	1
Unidentified, hemolytic bacillus -----	1
	235

SECOND GROUP.

Organisms Causing Infection, Not Usually Resembling Typhoid Fever.

Streptococcus -----	8
Pneumococcus -----	3
Meningococcus -----	1
Influenza Bacillus -----	1
Unidentified Bacillus resembling the Influenza bacillus -----	1
	14

In the first group of the above table, it may be noted that there are seven organisms, other than B. typhosus, causing eighteen cases which the attending physicians stated could not be distinguished from true typhoid fever. In most of these cases, however, the course of the disease was mild. The variety of these infections is far greater than anticipated. Para-typhoid fever in Virginia appears to be rare, especially para-typhoid A. Because of this fact, we advocate the use of the straight typhoid vaccine rather than the "triple vaccine," which contains also the two para-typhoid bacilli.

The cases in the second group, for the most part, developed symptoms corresponding to the blood culture findings. In one case, however, a death certificate had already been signed for typhoid fever before our report of the "pneumococcus present" was rendered.

In view of these results we are convinced more than ever that the blood culture is a most valuable diagnostic test. Without a blood culture, cases will be diagnosed as typhoid fever that are not, and some will not be diagnosed as typhoid fever that are. For a physician to diagnose "para-typhoid fever" without cultural confirmation, or specific agglutination, is inaccurate.

While there is no specific treatment for any of these infections a physician should, nevertheless, be interested in knowing what he is treating. Unquestionably, some of the unsuccessful protection reported from typhoid vaccine has been in cases where the infection was of some other nature.

From a public health standpoint, the type of infection is very important. The precautions necessary in a case of typhoid fever are hardly necessary in a B. coli infection. Likewise, it would probably be useless in this case to search for the source of the infection.

The Widal reaction or agglutination test, in suspected typhoid fever, should always be used in conjunction with the blood culture. By this I mean a real agglutination test made from whole blood, and not the obsolete and unreliable test made from a drop of dried blood.

In a general way the agglutination test is of most value after the disease has been in progress for ten days or more, and the blood culture of the greatest value during the first week or ten days. No definite limits can be set, however, and we find great variation. Therefore, the only dependable way is to get a specimen of whole blood and have both tests made.

Formerly we have supplied special outfits, containing bile medium, for blood cultures and other outfits for agglutination, but we now find this to be unnecessary. In Table II we have compared regular blood cultures with cultures made from the clotted blood, and obtained results as satisfactory by the one method as by the other, so far as typhoid fever is concerned.

TABLE II.

COMPARING BLOOD CULTURES AND CULTURES MADE FROM CLOTTED BLOOD.

Blood Culture Direct into Bile	Cultures from Clots		Total
	Positive	Negative	
Positive -----	19	3	22
Negative -----	3	65	68
Total -----	22	68	90

As shown above each cultural method disclosed three positive cultures not found by the other method. Nineteen bloods were positive by both types of culture and sixty-five were negative by both. It seems probable that the role of chance, due to the small amount of blood used, might account for this; that is, it appears that the clot-culture is about as reliable as the regular blood culture, but where

both are used, and consequently more blood examined, the chances of positive results are increased.

In the above discussion we refer only to organisms in the first group in Table I. Organisms of the second group in Table I do not grow in bile culture medium, yet we find this the most satisfactory medium for organisms of the first group. As it is not practicable to handle several different containers, where specimens must be mailed, and, as ninety-four per cent of all positive findings fall into group one, we have used only bile medium in our statewide work.

Where organisms such as the streptococcus, pneumococcus, and the influenza bacillus are suspected, bile culture medium is not satisfactory. In these cases suitable medium must be obtained from the laboratory, and the blood inoculated directly into this medium.

Since cultures made from the clotted blood have shown results as satisfactory as inoculating the blood directly into bile medium, a single tube of whole blood may be used for the two specimens. This simplifies matters greatly for the practitioner, as all that is necessary is to draw 3 to 5 c.c. of blood aseptically and put it into a test tube, just as is done for a Wassermann test. From the serum in this tube an agglutination test is made in the laboratory and from the clotted blood a culture. Negative results on both of these tests will rarely occur in true typhoid fever.

The laboratory methods used in all of this work have been described elsewhere* and will not be repeated here.

In conclusion I wish to point out:

First. Not all enteric fevers with certain clinical manifestations are typhoid fever.

Second. The blood culture is the only method of determining the nature of these other infections.

Third. For a reliable diagnosis in typhoid fever both a blood culture and an agglutination test must be made. A tube of whole blood, aseptically collected, will serve satisfactorily for both tests.

Fourth. In cases of suspected endocarditis, septicaemia, etc., special culture medium must be used in order to obtain satisfactory results.

SYMPTOMATOLOGY AND DIAGNOSIS OF EXOPHTHALMIC GOITRE.*

By Wm. B. PORTER, M. D., Roanoke, Va.

A study of the symptoms of a disease involves an analysis of those disturbances produced by the structural, metabolic and psychoneurotic changes incident to the perverted physiology in the affected being.

The diagnosis of a disease must involve a careful weighing of the evidence afforded by a study of the symptoms, the abnormal physical phenomena, the collected laboratory data, and lastly, a broad and common-sense amalgamation of all these into a composite picture of the clinical status of that human being.

During the last few years much has been accomplished in the study of the endocrine system, yet in no class of patients is one so liable to be tripped by symptoms or does one encounter such bizarre and uncertain physical phenomena as in the suspected case of exophthalmic goitre.

The perverted physiology and bio-chemical changes occurring in hyperthyroidism involve the entire somatic system; consequently, in no disease is it so important that the diagnosis carry with it a broad and complete understanding of all the immediate and collateral evidence of disturbed function, for it is only upon this complete inventory that a rational and sane therapy can be based.

In this discussion we are not interested in those patients who have a "lump" in the neck, and who have none of the primary or secondary manifestations of exophthalmic goitre and no elevation of basal metabolism. We are interested in those patients who, with or without thyroid enlargement, present symptoms and signs best grouped under the single term of "sympatho mimetic," the term of Barger and Dale to denote "manifestations that are tantamount to electrical stimulation of the thoracico-lumbar division of the involuntary nervous system, or to stimulation of this same system by adrenalin." Such signs include the cardinal symptoms of tachycardia, exophthalmus, goitre and tumor, and the minor symptoms of exophthalmic goitre, such as diarrhoea, sweating and palpitation.

The work of Lieb, Kessel, Hyman, and Lande has shown that this symptom-complex

*Straus, Am. Jour. of Pub. Health, Aug. 1921.

Straus, Jour. of Lab. and Clin. Med.

Straus and Bird, Am. Jour. of Pub. Health.

*Read in the symposium on "Disease of the Thyroid" at the Southwestern Virginia Medical Society in Abingdon, September 6 and 7, 1923.

can and does exist in patients who have no elevation of basal metabolic rate or who never have had such a disturbance of catabolic function. These observers have coined the term "autonomic imbalance" to denote that group who have all or most of the primary and secondary manifestations of exophthalmic goitre, but who do not or have not had an elevated basal metabolism, a group undoubtedly representing a much larger percentage than has been generally appreciated.

Recently, a woman thirty-six years old consulted me, complaining of nervousness, palpitation, tachycardia and dyspnoea with exertion. She stated that eighteen months previously she was operated on in another city, at which time a partial thyroidectomy was done. Her symptoms now were the same as they had been prior to her operation. At this time she was getting radiation over her thyroid which had been begun seven months previously. She felt that her symptoms were exaggerated rather than improved.

Examination disclosed most of the orthodox signs of exophthalmic goitre, i. e., slight exophthalmus, tachycardia, tremor and pronounced sweating of the hands and axillae. The basal metabolic rate was 36, -40, -38. This patient was given thyroid extracts and a tonsillectomy was done and in six weeks' time she reported feeling practically normal.

This case well illustrates one of the main points I wish to make in the consideration of the diagnosis of exophthalmic goitre. The diagnosis is complete and accurate in so far as it carries with it the information necessary for a sane and logical therapy. The patient was undoubtedly one suffering from "autonomic imbalance," who incidentally had a goitre. This disturbance of her involuntary nervous system had been activated by a focal infection in her tonsils and accentuated by the psychic insult of frequent abortions. The hyperthyroidism was no doubt the result of the thyroidectomy and prolonged radiation. The basis upon which treatment was begun and resulted in cure was not the disturbance of her involuntary nervous system but the knowledge derived from a study of her basal metabolism which showed a markedly depressed rate.

In a study of patients who present the manifestations of a Graves' syndrome, I believe it to be absolutely incumbent upon us to deter-

mine whether there is or has been an elevation of the basal metabolic rate before any positive therapeutic procedures are instituted. The work of Benedict, Means, Aub, Roth, Carpenter, Boothby, and a host of other observers has repeatedly shown that increased basal metabolic rate is the most reliable single sign in exophthalmic goitre.

In the routine study of patients, one encounters a large group whose symptoms are sufficiently suggestive to place them in the category of hyperthyroid suspects. These patients include those suffering from the neurasthenic states, disturbances of the autonomic nervous system, and functional derangement of the neuro-circulatory apparatus. If there should exist a coincidental goitre, the picture may be most confusing.

Means and Burgess have recently studied a group of border-line cases with particular reference to differential diagnosis. They found that the majority of the type with incomplete evidence of abnormal thyroid function had a normal metabolism. If a basal rate is secured, an increased basal metabolic rate is strong presumptive evidence of hyperthyroidism. They conclude that the metabolism test is distinctly useful in differential diagnosis.

I do not believe that these patients can be differentiated by any one laboratory test. It is usually possible to place them in their proper category by a clinical analysis of the individual, using the laboratory finding as confirmatory evidence, with due regard for its limitations and pitfalls.

The study of the endocrine system is in its infancy. The advances made are too frequently based upon speculation and hypotheses, hence conclusions are uncertain. The diagnosis of thyroid disease has not been simplified by any of the newer methods of study; rather it has become more complex, but this is not regrettable if we are able to more accurately define the type of patients demanding selective therapy.

The determination of this fact may be accomplished by a careful analysis of the existing symptoms and abnormal physical phenomena, yet there are few of us who would be willing to treat a case of typhoid fever without a clinical thermometer. Then why subject a patient to a major operative procedure or radiation until it has been determined with

some degree of accuracy whether such drastic measures are indicated? They may be, but there is a fair chance that they are not.

Various laboratory procedures have been introduced as an aid in determining hyperactivity in thyroid disease, the Goetsch test, Kettman's reaction, the Glucose Mobilization Rate, and many others, but undoubtedly the use of the closed calorimeter is the simplest and most consistent method at our command. The value of this method is in direct proportion to the appreciation of the necessity of careful and repeated tests. It is a laboratory procedure and is, therefore, not devoid of possible error, but when one properly balances it with a careful history, an analytical analysis of the symptoms, and a painstaking survey of the physical phenomena, one then has that data necessary for a logical diagnosis.

Lewis-Gale Hospital.

THE MEDICAL TREATMENT OF GOITRE.*

By W. W. CHAFFIN, M. D., Pulaski, Va.

The medical treatment of goitre was assigned to me and I have no choice in the matter, and must tell you not only what I believe about it, but also what is believed about it by medical men of note.

I believe all the authorities agree that the drug which has promised more for the relief of the symptoms of goitre, if not the cure, is iodine in some form.

Crile has shown that iodine is taken up by the thyroid gland when given by the mouth, by inhalation, or by external application, and it makes very little difference, from a scientific point of view, what form of iodine is used, as the thyroid will take it up from the most stable compounds, even mercuric iodide.

Wyeth even went so far as to report favorable results from the inhalation of iodine which were secured by the suspension in the patient's room of a wide-mouthed bottle containing a ten per cent solution of tincture of iodine.

The early Greeks treated goitre by the internal administration of the ash obtained by burning sea sponges, not knowing that the substance was rich in iodine.

In 1907, Marine emphasized the fact that iodine is necessary for the proper function of

the thyroid, and also that in active hyperplasia of the thyroid, the iodine store is reduced. Consequently, the administration of iodine should theoretically control this active condition. However, this is not the case practically, at least not to any extent. How many of us have seen the fruitless painting of the neck with iodine for this condition? About all we have seen is a tremendously sore condition of the neck added to the other discomforts of the patient. So much then for the iodine treatment.

The glandular treatment has been much exploited and as heartily condemned. Theoretically it promised much, but practically, it proved to be a "will of the wisp."

Personally, I have treated a good many cases with the different forms of medication and rest in bed. I have tried the iodine thyroidecine, sodium cacodylate, sedatives, etc., and I honestly believe that, aside from the rest the patient gets, the results from the treatments were nil; and the only good my treatment did was to rest the patient and get her in better condition for a surgical operation. So you see where I stand on the treatment of these cases.

SURGICAL TREATMENT OF DISEASES OF THE THYROID.*

By T. J. HUGHES, M. D., Roanoke, Va.

Doubt and inexactness add much to the problems of the thyroid. This fact is emphasized by the preceding papers in this symposium. The ground has been thoroughly covered as regards the pathology, etiology, diagnosis and therapeutic treatment of this important gland, which has been termed the "balance wheel of nutrition."

The etiology has been doubtfully accepted, therapeutic treatment is speculative in its results, and in most cases is varied and uncertain and, until we know more exactly the amount of thyroid tissue to remove to correct thyrotoxicosis, and yet avoid the ultimate results of excision of too much of the gland, we should avoid extreme radical thyroid surgery, bearing in mind the tendency in every field of modern surgery for the pendulum of radicalism to swing too far.

The differences of opinions of leading clinicians and surgeons upon thyroid problems,

*Read in the symposium on "Disease of the Thyroid" at the Southwestern Virginia Medical Society in Abingdon, September 6 and 7, 1923.

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which should have long ago been definitely settled and generally accepted, should make both the therapist and the surgeon accept, with solemn duty and responsibility, the management of diseased conditions of the thyroid gland.

Too much and too long treatment may stimulate the growth, increase thyrotoxicosis and bring disaster to the heart and nervous system; while removing too much or too little gland tissue, without proper preparation and analysis of the case in hand, may make a worse wreck of the patient or subject it to a recurrence of the devastating condition.

There is, probably, no subject more generally discussed, more indefinitely settled, and less generally accepted than are the problems of thyroid surgery. There are, however, a few facts which have been established by clinical observation, pathological and histological study and practical experience which should be emphasized, and should serve to strengthen our endeavor to avoid the pitfalls which beset the pathway of both physician and surgeon.

From the surgical standpoint, I would call attention to the fact that tumors of the thyroid are more often malignant than is generally supposed, that malignancy occurs earlier in life than is the case with perhaps any other organ of the body. Of 290 patients with malignant tumors of the thyroid gland, examined at Mayo Clinic from 1901 to 1921, more than fifty per cent developed goitre before they were thirty years of age, and about twenty-five per cent of this series had not noticed any thyroid enlargement previous to one year before the diagnosis of malignancy was made; hence the importance of avoiding prolonged stimulating treatment, and referring these cases early for surgical treatment before the gland or tumor undergoes malignant degeneration. Louis B. Wilson, from a careful study of the pathology of tumors of the thyroid, believes that they all have their origin in proliferating "fetal adenomas." It is most important that all nodular tumors of the thyroid be examined and, if markedly proliferating adenomatous tissue is found, the tumor should be considered potentially malignant and the thyroidectomy followed by X-ray treatment, and the patient kept under observation for a long period of time.

Eminent surgeons differ in their opinions as to the diagnostic value of the reading of the

metabolic rate, some relying to a very great extent on this index as an aid in diagnosis and relative safety in operative procedure, while others almost wholly disregard it. It does seem, however, that, if nothing more, the metabolic rate is of great importance in differentiating between psycho-neurosis and true thyrotoxicosis, especially when the thyroid is not appreciably enlarged. The writer believes, perhaps contrary to the general opinion, that exophthalmic goitre and all toxic adenomata are purely surgical conditions, and that the health of the patient would be better conserved if all tumors of the thyroid, in adults, were removed as early as possible after recognition. Both the psycho-neurotic cases, with little or no thyroid enlargement, and the non-toxic cases with thyroid enlargement, are dangerous pitfalls and may lead to disastrous delay.

The diagnosis should be definitely made; the degree of damage from thyrotoxicosis determined and remedied as far as possible by appropriate preparatory treatment; then bear in mind that any plan of surgical procedure we may decide upon is dangerous. No operation should be attempted, not even a preliminary ligation, until the probability of an approaching crisis has been reckoned with.

The question of "When and How" to operate is another problem afflicted with divergent opinions. The relative safety in primary ligation, multiple stage operation, and operation in one stage, is by no means settled. Mayo and Crile ligate frequently, with confidence in its safety and benefit, while Finney, McGuire, and others apparently consider it an unnecessary ordeal. I am not convinced that, after the preliminary rest and preparatory treatment, primary ligation has any advantage in safety over multiple stage excision, provided care is taken not to do more than our patient can stand; and whether the gland is removed in one or multiple stages, in extreme toxic cases, the incision should be left open, packed and closed on the following or second day after operation. If death is going to result from hyperthyroidism, it will usually occur within a few hours after operation; therefore, the surgeon and all assistants should remain on the job and employ every means to sustain the patient and to combat reaction of the temporary hyperthyroidism. Ice bags to the head, heart and groins, saline and glucose solutions by proctoclysis, hypodermoclysis, and intra-

venously, if necessary, should be employed.

The most popular incision is the ordinary Kocher collar, made in such a way that a string of beads will cover the scar, the flap dissected up, the muscles retracted without division, if the size of the tumor will admit of its removal without difficulty. If, however, dexterity is enhanced, the muscles may be divided and sutured without appreciable loss of function or deformity. From four-fifths to seven-eighths of the gland is excised, leaving a floor of thyroid tissue and the posterior surface of the capsule overlying the trachea, and protecting the parathyroids and recurrent laryngeal nerve from damage during the operation.

ANESTHESIA

In my opinion, one of the most important questions the surgeon is called upon to decide in thyroid surgery is the proper anesthetic to use. Gas-oxygen, local analgesia and general narcosis, all have their advocates. The writer is convinced that local, or a combination of local and gas-oxygen anesthesia, should always be used in exophthalmic goitre and other forms of toxic adenomata.

1st. The condition leading to surgical shock, such as position of the patient's head, producing dyspnoea, undue pressure from instruments, and the afferent stimulation of the sensory nerves, are greatly lessened by the use of local anesthesia. The patient is a welcome assistant in avoiding injury to the recurrent laryngeal nerve by being able to cough or talk at the suggestion of the operator.

2nd. Post operative nausea and vomiting rarely occur and consequently the tendency to hemorrhage is lessened.

3rd. Liquid nourishment may be given immediately after operation, and the employment of hypodermoclysis, proctoclysis and intravenous methods of supplying needed fluids are often found unnecessary.

4th. The danger of post-operative pneumonia is eliminated and, in our experience, post-operative reactions of hyperthyroidism are fewer and less severe, under local anesthesia.

Satisfactory anesthesia may be obtained either by infiltration or nerve-blocking methods. A half per cent solution of novocain, which has been boiled, is used. If the infiltration method, or combination of both, is used, the dissection of the flap is facilitated by thick-

ening of the subcutaneous tissues of the neck by the inhibition of the solution injected.

With the proper preparation of the solution, healing should be by first intention. The patient is allowed to sit up on the second day, and leave the hospital at the end of the week, or ten days.

The post-operative treatment consists in sustaining the heart and quieting the nervous system, as suggested above, in avoiding or combating surgical shock and the temporary hyperthyroidism which often follow thyroidectomy. To this end, in addition to the measures already mentioned, we give large doses of digitalis, which is begun a day or so before operation, and continued until the heart's action is quieted to within normal limits after the operation. The patient is kept quiet and the nervousness controlled for the first twenty-four hours by morphia hypodermically, bromides and chloral, and such other quieting and sustaining remedies as may be indicated.

The following is a brief report of a case operated on yesterday. Mrs. P., age 43, entered the Shenandoah Hospital, September 1, 1923, complaining with pelvic and bladder discomfort, generally run-down condition, very nervous, loss of flesh, rapid pulse, foul breath and extreme weakness. A goiter about the size of a lemon, which to her mind was not giving her trouble, was observed. Further examination revealed metabolic-rate plus 38, blood pressure S. 140, D. 105, pulse rate 130, urine negative, except there was a large quantity of bladder epithelial cells. Except for the rapid pulse and slight irregularity, the heart showed no abnormal condition.

Family History: Married, has seven children, all living and healthy, except three have goiters. The patient has had her goiter for the past twenty-three years, has enjoyed good health up to the past few months, when the symptoms given above began and have gradually grown worse; she has marked tremor but no bruit and no exophthalmus. Blood examination negative.

Diagnosis: Toxic adenoma of the thyroid. Operation performed September 5, 1923, under local anesthesia, employing the combined block and infiltration methods; pulse at beginning of operation was 110, at the close 88. As the patient's condition was good, we closed the incision.

A letter from this patient about three months after this article was written states that she is now enjoying perfect health.

Ameriacn National Bank Building.

THE THYROID PEDIATRICS.*

By ROGER H. DUBOSE, M. D., Roanoke, Va.

It is my sole object in this paper to discuss briefly the most common types of thyroid disease in infancy and childhood.

In the last five years there has been a great advancement in the field of "Ductless Glands." The possibilities of further advancement in this field are perhaps greater than in any other branch in medicine. We still know very little about the function of these glands. We do know that the thyroid secretion has something to do with the development of the young, both mentally and physically.

The most common forms of thyroid disease are cretinism and myxedema. These are merely different expressions of a hypo-functioning thyroid gland. The clinical signs of the cretin are characteristic, yet the diagnosis is not always simple in the very young, for we are apt to be confused with a mongolian idiot and achondroplasia. Some authorities believe that cretinism is often due to psychical disturbances during pregnancy. We now accept the fact that cretinism is due to the absence of the internal secretion of the thyroid gland. The same condition holds true where the gland is removed by surgical means. Congenital absence of the gland is often times noted in post-mortem findings. It is spoken of as congenital myxedema.

The clinical signs of the cretin are not so evident in the very young, yet an early diagnosis is most essential, if we expect to obtain our very best results by the administration of thyroid extract.

Physically, cretins are short in stature, usually under weight as compared to the normal infant. The hands and feet are small. The thumbs are especially short. The skin is very dry, rough, wrinkled and often times copper colored. The neck is short and thick. The nose is broad and flat. The tongue is thick and protrudes. The fontanelles are late in closing, likewise dentition is delayed. The cretins are habitually constipated. The ma-

jority of them have umbilical hernia. The temperature is sub-normal. The hair is coarse, dry and straight. Talbot, in measuring these infants found the length of the arm from the acromion process to the tip of the second finger to be shorter than in the normal infant, likewise the length of the leg from the pubic bone to the sole of the foot to be much shorter than in the normal. The head of the cretin appears to be much larger as compared to the normal child but, if measured, it will be found to be approximately the same.

Mentally, these infants have a stupid facial expression. They are as stupid as they appear to be. They do not sit, walk or talk as early as the normal child.

Fisher, as well as Talbot, found the basic metabolism in cretins to be much lower than in the normal. The same is true in some cases of mongolian idiocy. It is exceedingly difficult to obtain the basic metabolism in the very young. That being the case, it occurs to me that the most practical method to pursue, when we suspect a mental retardation, is to put these infants on thyroid extract. The earlier the administration of thyroid extract is begun, the greater the improvement will be, both mentally and physically. The longer the treatment is delayed, the greater the chances are for the cretinoid condition to become fixed.

No hard fast rule can be laid down as to the quantity of thyroid extract to be given to the unfortunate ones. Some will tolerate larger doses than others. Talbot says the maximum dose of thyroid is that which would bring the basic metabolism up to the basic metabolism of a normal child, of the same age. I usually begin with a small dose, and gradually increase it until my patient shows signs of some nervous manifestations. They often times will tolerate 1 to 3 grains a day. When the pulse becomes quickened, it is advisable to reduce the dose to one-half, and gradually increase it again.

Achondroplasia is a rare disease in children because of the fact that very few infants having the disease survive infancy. They are usually prematurely born, or develop hydrocephalus soon after birth and die. When these infants do develop into childhood, their mental powers are normal and the physical condition is usually good. Teeth usually appear at a normal age. The most notable feature is the shortness of their limbs, while their bodies are

*Read in the symposium on "Disease of the Thyroid" at the Southwestern Virginia Medical Society in Abingdon, September 6 and 7, 1923.

of normal length. The parts affected are those portions where cartilage is replaced by bone.

I do not know just what the basic metabolism would be in these infants. The rarity of the disease probably prevents much research work in these cases. So far as I know, there is no treatment that will produce growth.

The mongolians differ from the cretins in having a comparatively thin neck, normal temperature, soft smooth skin, and slanting eyes. They are not as short and chubby as the cretins. The similarity of a mongolian and cretin in the old is not so evident as in the young.

As stated above, in some cases of mongolian idiocy the basic metabolism is low. In these cases, thyroid extract is of therapeutic value. Evidently there is some close connection between these diseases. This is also true in some cases of a mental defective.

I have a boy, now four years of age, who came under my observation one year ago. At the age of two and one-half years he could say three or four words. He was seven months of age before he sat up. His first teeth appeared at nine months of age. He stood alone at fifteen months of age. He was three pounds under weight. He appeared to be nervous, restless and irritable. Family history negative. No history of birth trauma whatever. The tonsils and adenoids were removed at two years of age. A diagnosis of mental defective was made, and he was put on mixed glands.

In less than six months there was a decided change in the child's mental condition, and today you would not suspect him to be mentally defective, yet his physical powers are slightly below normal. His disposition has changed to that of the cheerful, playful child. He appreciates his toys and is much more obedient.

Hyperthyroidism is said to be due to the hyper-secretion of the thyroid gland. The disease is rarely seen in children. The ratio is about one to fifty as compared to adult cases. When it does occur, they have a protrusion of the eyes (exophthalmus), muscular tremor, palpitation of the heart (tachycardia) and usually bilateral enlargement of the glands. They often have hemorrhage from the nose because of the increased blood tension. The symptoms are practically the same as those seen in adult cases. It is well to remember that in the young you are dealing with the growing organism, and in the adult that fact

may be disregarded. The basic metabolism is increased in these cases and acts as a good guide for a definite diagnosis.

X-ray therapy in the hands of an experienced operator, and surgery are the most important methods of treatment I know. Various drugs have been advocated, such as belladonna combined with iodide of sodium, strophanthus, digitalis, and spartein sulphate have also been used with very good results.

In conclusion I want to emphasize:

It is most important for us to differentiate between mongolian idiocy, achondroplasia and cretinism in the very young. I would suggest that we place every suspected mentally defective case on mixed glands. In this ray we are most likely to derive some benefit. We cannot do any harm if we keep these patients under close observation and do not push the drug too rapidly.

When a definite diagnosis of cretinism is made, the administration of thyroid extract should be continued indefinitely. The same is true in other mentally defective cases where improvement is seen.

Anchor Building.

ROENTGEN RAY TREATMENT OF HYPERTHYROIDISM.*

By JOSEPH T. MCKINNEY, M. D., Roanoke, Va.

In the preceding papers of this symposium, the diseases of the thyroid gland have been so fully covered that we shall deal only with the X-ray treatment of hyperthyroidism. The colloidal, cystic, simple goiters, non-toxic adenomata, and those with normal or reduced function causing deformity and pressure symptoms, should never be treated with the X-ray, but treated surgically. Malignant goiters should first be operated upon (if not inoperable) and later followed by an intensive course of X-ray therapy.

The two types of goiter in which X-ray therapy offers good results are the exophthalmic goiter, and toxic adenomata with hyperthyroidism, the latter condition having been first and completely described as a definite clinical entity by Plummer. The X-ray then is not a treatment for goiter, but for hyperthyroidism, manifested by constitutional disturbances due to toxemia caused by an excessive secretion of thyroxin, which markedly

*Read in the symposium on "Disease of the Thyroid" at the Southwestern Virginia Medical Society in Abingdon, September 6 and 7, 1923.

stimulates the oxidative process throughout the body.

Increased basal metabolism and estimation of the basal metabolism rate, gives us the most accurate determining factor of the increased secretion of the gland, enabling us to follow the course and results of treatment. No case should ever be subjected to X-ray therapy without careful basal metabolism studies before, during, and after treatment. This one point cannot be too strongly emphasized.

Brilliant as have been the results achieved by surgery in the treatment of toxic adenomata with hyperthyroidism and exophthalmic goiter, the fact still remains that the results even in the most skilled hands are not all to be desired. Development of surgical technique and surgical management of these cases in such master hands as the Mayos and Crile has been one of the outstanding achievements of surgery during the past decade. However, modern surgery has accomplished about all that can be hoped for from surgical measures. For further advances in the handling of these cases we must confidently look to radiation in some form or other. That much remains to be learned in this comparatively new field, all roentgenologists admit, but that brilliant results can be obtained in a number of these cases has been proven beyond doubt in the hands of numerous roentgenologists all over the country.

Surgery in the final analysis aims to remove a proper portion of a hyper-excited gland, but in this we are not then affecting a cure of the hypersecretion. The amount of gland to leave must be based purely upon the judgment of the operator. The X-ray on the other hand not only helps to destroy the gland, but to inhibit the function of the cells composing the glandular structure. According to Holmes and Means "These cells atrophy and disappear and are replaced by connective tissue, which later contracts and interferes with the blood supply to such an extent as to further inhibit glandular function."

Before X-ray treatment is begun, a careful physical examination by a competent internist should be made, all foci of infection looked for and corrected, if found, basal metabolism tests made, and the type of goiter determined. It is absolutely essential that the roentgenologist have the closest co-operation of the internist in the handling of these cases. The

great importance of rest, diet, proper daily regime, and co-operation of the patient must not be overlooked.

Treatments are usually administered at three week intervals, from three to five treatments being given. If a patient does not improve after three months from the time of beginning the X-ray treatment, further treatment should not be given in the light of our present knowledge. Usually three areas over the thyroid are treated, using 5MA. 6MM. of aluminum filter, 9 inch spark gap, 8 inch distance and 5 minutes time over each area.

Dr. Richardson in speaking of the Roentgen ray treatment at the Massachusetts General Hospital, under the direction of Dr. Holmes, states "X-ray therapy will accomplish the cure of a percentage of cases, in others bring about improvement. In some cases the results of treatment are as brilliant as any I have seen by any therapeutic agent."

My own experience bears out that of other workers, some cases showing splendid results and, so far as we can determine to date, permanent cures. It is only fair to state, however, that in some few instances patients have not improved. Only recently a case which had not responded satisfactorily after three treatments was advised to seek surgical relief, which she did, and so far as we can judge seems to be doing well. Many other cases have improved, though of course cases which have developed permanent myocardial damage cannot be cured either by surgery, or X-ray therapy, though they may be relieved of their symptoms.

A brief report of the following two cases may be of interest.

Case 1. Mrs. C. P., married, age 46, referred by Dr. George B. Lawson, April 31, 1922. Patient presented a typical history for the past six months of the usual classical symptoms of toxic adenomata, complicated by myocarditis. She had lost fifteen pounds of weight in that time, was exceedingly nervous, and was running a pulse rate of 120 to 140. Her metabolic readings, as reported by Dr. Lawson, were as follows: April 31, 1922, (63-56-53) average 56, July 22, 1922, (36-35-39) average 36, August 9, 1922, 30-30, January 8, 1923, 42, March 21, 1923, 35, May 21, 1923, minus 4, plus 2.

Patient was given four X-ray treatments on the following dates, April 31, 1922, June 28, 1922, September 22, 1922, and January 8,

1923. She showed definite signs of improvement after the second treatment and has steadily improved in every way. About ten days ago patient saw Dr. Lawson, and he reports that she was relieved of her symptoms, and that her progress had been entirely satisfactory.

Case 2. Miss S. H. McC., age 35, seamstress, referred by Dr. J. W. Preston, April 8, 1921. He reports that he has had patient under observation for a little over one year, during which time she has been running a pulse rate of 100 to 114, weight 114, blood pressure 140/80, temperature normal. Patient complains of nervousness, loss of sleep, trembly sensations, and general debility. The thyroid showed all three lobes to be slightly increased in size. Slight tremor of the fingers was noted, knee kicks increased, and disturbed heart action present. Tonsils were reported to be diseased and were removed July 14, 1920, though little change was noted in her general condition following tonsillectomy. Chest was negative at all examinations.

Although we were unable at this time to have basal metabolism tests made, X-ray therapy was advised, patient being given treatments on the following dates, April 8, 1921, May 7, 1921, July 2, 1921, and December 22, 1921. She began to show marked improvement after the third treatment and continued to improve steadily. Her condition at present is good, she is relieved of all her symptoms, has gained over twenty pounds in weight, and has been able to resume her occupation as a seamstress.

The results in the above two cases have been duplicated in a number of others. Only recently a young woman, who had been under observation for over a year and was given four X-ray treatments, recovered to such an extent that she was able to get married this summer.

CONCLUSIONS:

Let me again emphasize that all cases of colloidal cystic, simple goiters, non-toxic adenomata, and those causing deformity and pressure symptoms, should never be treated with the X-ray, but treated with surgery when the occasion demands intervention.

Many cases of exophthalmic goiter and toxic adenomata with hyperthyroidism can be offered permanent cures, and others greatly improved by X-ray therapy. However, should improvement not be noted in three months,

further X-ray therapy should be abandoned and an operation advised.

The closest co-operation between the internist, surgeon, and roentgenologist should be maintained in handling these cases. Repeated and careful basal metabolism tests should be made before, during, and after X-ray treatment.

Anchor Building.

SHOULD VIRGINIA HAVE A DEPARTMENT OF PSYCHIATRY?*

By L. S. FOSTER, M. D., Williamsburg, Va.

To give an affirmative answer to the question, we must show the need of a psychiatrist from the standpoint of public welfare and mental hygiene and whether or not such a department will be a liability or an asset to the State.

We go on from day to day feeling that all is well and conditions satisfactory, because, if a person is insane and a menace to society, he or she is committed to an institution, and we overlook the fact that there are as many if not more persons of the moron type, borderland cases, who compose the large majority of delinquents and defectives dealt with in our Juvenile and Police Courts every day and who are passed on to jail, to the great detriment of the offender. We endeavor to wreak vengeance on certain persons for committing offences and in order to accomplish this we lock them up for a while behind steel bars, at much expense, but we make no effort to find out what are the actual causes of their criminal conduct and how best we can eliminate such causes and prevent future crime. We concern ourselves with the deeds of the criminal and overlook his needs. We assume that all men, except those obviously insane are equally responsible and if they commit crime, should be punished, feeling in a vague way that this will compensate for the evil acts they have committed and for the outrages they have wrought on society. Somehow, we hope this will deter them from future criminal conduct. The newer and growing conception is, that the offender rather than the offence is the thing to be studied and understood and that the treatment be regulated more by the moral and mental make-up of the offender than by the nature of the offence,

Certain causes for human failure and anti-

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social conduct are readily discoverable by scientific methods. Studies have been made in courts and penal institutions in this and other countries, which show, as far as crime is concerned, that the most important element in the whole situation is the criminal himself and conditions which are found within him and within the environment which influences him. From sixty-five to seventy-five per cent of the inmates of our penal and correctional institutions show physical and mental conditions which have every thing to do with their criminal conduct. You would no doubt find, if diligent inquiry should be made, that two out of every three persons sentenced to your correctional institutions and almost every other person passing through your police court is a recidivist (a repeated offender). If this be so, then we have failed in that which we set out to accomplish in these cases, the prevention of crime; nor have we protected society from them, if they promptly return to the same criminal conduct they exhibited before their arrest. What would you think of an hospital that, after a fixed period of time, returned to the community two-thirds of its cases in no better condition than they were the day they entered the hospital?

This is a plain matter of common sense and public welfare. It is a matter of criticism of our entire system of dealing with offenders. The solution of this evil is a psychiatrist, who can carefully study each offender, as to his physical, neurological, psychiatric and social status; in other words, to find the underlying cause for his conduct, to know his constitutional make-up, his physical and mental condition, and the many and varied causes from within which have every thing to do with his criminal conduct. The most important thing we can bring to this entire problem, is the organization of diagnostic machinery for the careful study of the causes of delinquent conduct and the wise mapping out in the light of this study, of intelligent and far-reaching medical, social and educational treatment.

We believe this problem can be approached and dealt with in the same scientific spirit, with which we have attacked other human evils, such as tuberculosis, yellow fever, malaria, typhoid and other diseases. To do this most effectually, we must investigate the cause of the juvenile offender. It is of the most profound significance to our country that

crime has its roots deeply planted in childhood. We think of the greatest woes of childhood as destitution and disease, but delinquency of a degree requiring the attention of courts and officers of the peace, shadows the lives of more children than do some of the most prevalent and serious diseases and the danger of entering upon criminal careers is a more threatening one than is hunger or bodily neglect. The adult is what the child was; so, if we can control the mental, physical and moral life of a child, we can more efficiently direct its future action as an adult. This is the keynote to the program for attacking crime. Childhood is the golden period for this prevention program. In the Juvenile Court, the public school and at home will we find the criminals of the future. What we do or fail to do for these maladjusted children today, will show itself in their criminal or non-criminal conduct in later life.

The need of a psychiatrist to aid the court in recognizing the presence of feeble-mindedness, insanity and other conditions, and giving to persons so afflicted the type of care and treatment they in all justice have a right to demand, can not be doubted. The service of the psychiatrist in such cases will and should have no relation to the question of guilt or innocence of the offender. These are legal matters and are based on facts of evidence, which indicate whether or not the individual did or did not commit the offence in question. The service of the psychiatrist will be after the legal question of guilt or innocence has already been determined; then it is he can afford the court most important aid in the way of information, that will assist in determining what sort of disposition is in the best interest of public welfare and will do the most good for the offender.

The National Committee for Mental Hygiene, New York City, in 1922, made a survey of delinquency and dependency problems in St. Louis, and a part of their report shows that sixty-nine per cent of 178 prisoners studied at the workhouse, after thorough psychiatric examinations, were found to be classified in terms of deviation from average normal mental health; were handicapped by nervous and mental conditions, which are important factors in their delinquent conduct. Thirty-seven per cent was found among those diagnosed, psychopathic personality. This is

in keeping with findings in courts and penal institutions throughout the country. It is the psychopathic individual who furnishes us with our delinquent problem, the unstable, neurotic, poorly balanced individual with marked character defects and personality handicaps, but apparently with good intelligence, is the most difficult problem we have to meet in handling criminals.

Time will not permit me to go further into this phase of the subject. Suffice it to say, that every intelligent, broad-minded man and woman who has studied the subject will agree that, from the standpoint of public welfare and mental health, the State should have a psychiatrist. As to the question of liability or an asset to the State, permit me to say, that it should be remembered that expense is no excuse; we are already shouldering the burden of our failure to early recognize and prevent conditions that have caused despondency. It is not a question of whether we want to pay, that we are doing already. It is a question of whether we want to pay intelligently in treatment, social adjustment and prevention, or unintelligently in relief, financial aid and custodial care. The cost of such a department for the State will be nominal as compared to the saving in its criminal expenses; but it is the aid to the courts and the duty we owe to the offender to give him the best chance to make a useful citizen. These are matters of vital importance to every citizen of this Commonwealth. As has been said, every life is either an asset or liability to society and industry and it should be the aim of the State to aid the unfortunate defective and delinquent in every way, lest we fall short of our duty.

I doubt very much if any of you have carefully examined the State Auditor's report for the year 1922. That report shows that the total expense of the criminals in the counties and cities amounted to the sum of \$742,448.40. The astounding part of these figures is the fact that it cost the State for maintenance of prisoners in county jails, that is for board, clothing, medicine and medical attention, \$210,728.92 and for the cities the sum of \$167,552.08. Just remember this, that for the misdemeanor cases only, it cost the State \$89,171.48. You may ask, what we can do about it? I answer, in the first place, have the misdemeanor cases examined to ascertain the cause of their delinquency; you would be surprised

to know how many of them are repeaters, mentally deficient, of the moron type.

We should have a State law empowering the judges to give an indeterminate sentence, which beyond question is the most intelligent method to be employed in the sentencing of prisoners, especially the misdemeanants. The indeterminate sentence is based on the theory that, while an offender should be withdrawn from the community for a season in the interest of public safety, he is to be released when he is thought ready to become a useful citizen. This will be decided by the judge, when in possession of all the facts as to the prisoner's mental and physical condition, presented for his consideration by the psychiatrist; then if he is to be returned to the community, he should be placed under the kindly supervision of a well-trained parole officer. The period of release from the penal institution is one fraught with great danger to society as well as the prisoner himself. It is most important that he be tided over this risky period and assisted in every way to readjust himself to normal living.

The obligation of the State to fit prisoners, so far as possible, for that honest work, the lack of which brought most of them into prison seems clear. They go into the jail without a vocation, trade or calling of any kind and they go out in the same condition. The main object of the prison administration should be to fit a man to lead an honest and useful life after his discharge; otherwise, with the best intentions, finding himself incapable of earning an honest livelihood, he will, when discharged, if not supervised, almost invariably turn back to evil ways, and thus you have the recidivist. The psychiatrist can save the State much expense by locating the cause of the repeater, which is most frequently mental and, by proper treatment and management, relieve the courts of their annoying and incessant reappearance. All the misdemeanor cases and addicts should be placed where they can be made self-sustaining and treated as defectives, instead of being made to languish without employment in our jails, at great expense to the State and often in a more pitiable condition when released than when committed.

The problem of the prisoner is educational and mainly one of industrial training. In order that this industrial training shall be effective, there must not only be vocational schools, but industries into which men may be drafted

and in which they may develop their proficiency for the benefit of the State instead of being a charge and there can be no better or healthier place for them than on a farm. Those who for the past twenty years have obtained practical results in the handling of offenders and have passed the experimental stage, feel that the district farm can be made the greatest factor in the reformation of the misdemeanor.

We have in this State three prison farms, one at Occoquan, operated by the District of Columbia, one for the city of Lynchburg, and the other for Newport News. Richmond has been talking about a city farm for some years, but up to this time has done nothing more. Norfolk a few years ago purchased a large farm but has progressed no further. The Occoquan farm is a wonderful institution and doing splendid work for its prisoners. The Lynchburg City farm for the year 1922, with only 77 city prisoners and 81 State prisoners, was operated at an expense of only \$351.30 to the city. It is a very great pleasure for me to state that the city farm of Newport News, with 151 city prisoners and 56 State prisoners for ten months of this year, that is from January 1st to October 31st inclusive, with an expenditure of \$12,668.59, in which amount is included \$3,000 for improvements, had receipts of \$23,146.68, including a balance of \$2,569.18 from last year—a splendid showing. The citizens of this city have every reason to be proud of their fine farm and their industrious and intelligent manager. If we had an indeterminate sentence law, the number of prisoners sent to the farm would be at least four times as many as are now sent, with profits in proportion. If this city farm can feed her prisoners at an expense of seven cents a day, why should the State pay sixty cents for the first twenty-five prisoners, fifty cents for the next twenty-five, and twenty-five cents for all over fifty, to the county and city jails, besides denying them the sunshine, fresh air and healthy surroundings, which God intended that every man and woman should have?

Isolation, created by a distant and impersonal supervision, such as we find in most of our jails, is the greatest barrier to reformation that could be built around the first offender. His errors are often the consequence of bad environment and lack of will power and he can not be corrected by indifference and disci-

pline, but by kindness and encouragement.

These thoughts are not advocated from merely sentimental considerations, but from a sincere belief, that the ends of justice are best served by palliatives, rather than by vindictive methods. I believe in the people, but unfortunately the great mass of our citizens are not informed as to the conditions existing in some of the jails of this State. If they were, they would use every effort and every spark of humanity to alleviate the trouble. It is a blight upon our civilization and a reflection upon our intelligence to stand mute in the face of the crowded condition of some of our city jails and do nothing.

PRESENT DAY ATTITUDE TO APPENDICITIS.*

By CHARLES R. ROBINS, M. D., Richmond, Va.

The history of appendicitis and its treatment occupies an important position in the history of surgery. The discovery of the nature of this trouble, the debate as to whether its treatment should be medical or surgical, and the decision that it was purely a surgical condition, were more or less coincident with the development of modern surgery, and in a way was one of the active causes of the movement which resulted in the modern standardized hospital. Previous to the advent of appendectomy, the abdomen was a forbidden city; gynecology was largely a matter of pessaries and office treatment; and abdominal operations were comparatively rare and the subject of intense interest and doubtful outcome. When operation became the recognized treatment, operations began to be more frequent; technique became a matter of supreme importance and intense study, and the necessity of providing a place where proper technique could be efficiently carried out and operative care and treatment supplied called for more and better hospital accommodation.

Appendicitis soon became a vogue, both with the patient and the surgeon, and the ability of the surgeon was indexed by the number of appendectomies he had performed and the number of recoveries. As a result of this a number of discoveries were made. The most important was that the success of the operation depended on early intervention. Even the worst types of appendicitis, those with gan-

*Read at a meeting of the Richmond Academy of Medicine and Surgery, November 27, 1923.

grene and rupture, were followed by prompt and easy recovery if the operation were undertaken early enough, and it became quite common for long series of cases to be reported without a death. Mortality was reduced to a point of often one to one-half per cent. The profession became alive to the possibilities of prompt surgery, and an abdominal pain became synonymous with a ride to the hospital at any hour of the day or night and an immediate operation. It was discovered, also, that many of the symptoms ascribed to other pathological conditions were really dependent on pathology in the appendix. Cases of indigestion, recurring nausea, pelvic disturbances and various other symptoms too numerous to mention, were found to be relieved by the removal of the appendix, and so chronic appendicitis developed its vogue also.

The safety and confidence inspired as a result of the experience in this line of surgery and the results attained, led to the invasion of other fields, and it was then discovered that there was rather more or less common pathology affecting other portions of the gastrointestinal tract, particularly the gall-bladder and duodenum, together with various kinks and ptoses. Then we had the general abdominal exploration and the development of various slogans, as for instance, "There is no such thing as indigestion," and "pain means pathology."

It is needless to say that as a result of such a wholesale onslaught, it did not take such a great while to develop a negative side; and cases began to crop up with rather disconcerting frequency which had been operated on for this, that and the other, and which had either not been benefited or had been made worse. Cases of acute appendicitis continued to have attacks of pain until they passed the gravel, and so forth.

It was then that the surgeon began to feel the need of an internist. The feeling that every one could be cured by a surgical operation began to be followed by doubts as to whether in any given case cure would certainly follow; and we are now in the stage of the complete study of the case. The pessimism that arises from failures is a very healthy thing. It should lead us to avoid errors and to approach more nearly the unattainable 100 per cent cures. The necessity for exact diagnosis so insistently demanded at the present time and the analysis of results are among

the most gratifying developments of the medicine of today; but notwithstanding this, I have noticed in the last few years what appears to be a more or less general change in the attitude toward appendicitis, and it is to several of these points that I wish to call attention now.

The general impression is that the mortality from appendicitis is very small, usually spoken of as one-half or one per cent or less. Now this is a mistake. It is an ideal which can and should be attained, but is not. If every case of acute appendicitis were operated on at the right time, in the incipency of the attack, there would be practically no mortality. But in a delayed case, whatever the treatment followed, there is and always will be, a definite more or less large mortality. As easy and as certain as is the early operation, the delayed operation presents complications and difficulties that make them as serious as any that we are called upon to perform, and call for the exercise of the best judgment based on a thorough experience. We are, therefore, wrong if we think of appendicitis as a slight operation easily performed at any stage and followed by a certain recovery. Such results can only be attained by early and prompt intervention. I think I find, however, that the difference between the two types of early and late cases is not as clearly defined as it should be, and there is a rather apparent tendency among practitioners to reserve operation for those cases which, as they say, really need it, expecting the same favorable results when the operation is finally performed. I have observed that the number of delayed cases is apparently increasing.

It is often extremely difficult to determine the seriousness of the case in the incipency of the attack. This is particularly true of gangrenous appendicitis. These cases not infrequently present comparatively few evidences of the serious nature of the case until the onset of peritonitis; and it happens frequently with me, and with others, that a patient apparently in very good condition and presenting few signs of a serious malady, will walk into the hospital and at operation be found to have an appendix that is gangrenous in part or throughout. Delay in such cases must inevitably result in serious complications and doubtful outcome.

The differential diagnosis between appendi-

citis and other conditions is often difficult. Infection of the kidney, stone in the kidney and ureter, strictures of the ureter and many other conditions not related to the gastrointestinal tract, will produce symptoms quite closely resembling appendicitis. In the past it often happened that a case would be operated upon, few if any evidences of appendicitis found, and the subsequent history would later reveal the true nature of the trouble. These errors of diagnosis have made the surgeon more cautious, and it is the general practice now to review every case carefully, particularly with reference to these pitfalls in diagnosis. As a consequence, cases brought to the hospital for immediate operation are often held up until the doubtful points can be eliminated.

The routine examination of the blood and urine has proved to be very helpful and, where necessary, the roentgenological examination has been used to clear the urinary tract of suspicion. Even with these aids, confusing points may still remain, and the treatment of the case must become a question of judgment. These aids can be applied without serious loss of time or hazard to the patient, but the inevitable result is that in a fair percentage the operation will be very properly postponed or found to be unnecessary or a different operation or treatment instituted.

This doubtless is sometimes embarrassing to the attending physician who may have rushed the patient to the hospital having impressed the necessity of immediate operation to save life or dire consequences. However, I think that the question of diagnosis must always be left to the surgeon who must of necessity be a diagnostician as well as operator, and the case should be referred for review as well as operation. The properly equipped hospital has means for perfecting a diagnosis that are not possible outside in their entirety, and these, added to the larger experience of the surgeon in his particular field of work, must be recognized as making his final opinion of the case paramount. However, these procedures and this delay has created an uncertainty and indefiniteness in diagnosis on the part of the attending physician and he hesitates to refer the case until his diagnosis is more complete. One of the greatest aids to diagnosis is at this point used, namely observation, which requires delay. This is quite scientific in a way but

may also prove to be dangerous. Every case of appendicitis should have the chance of an early operation, and there can be no question but that doubts are more safely cleared up in the hospital than elsewhere.

The reason for this paper lies in the fact that I have observed recently a growing disposition to react against some of the tenets previously held in reference to appendicitis and to unlearn some of the fundamental lessons that we have learned, we thought, rather thoroughly. I have been impressed with the fact that I am called on more frequently than formerly to treat serious and delayed cases; and in talking to physicians I have been impressed with a growing spirit of indifference to the dangers of appendicitis and an attempt to do the impossible, and that is to tell whether the case of appendicitis is one that should be operated upon or not.

The facts are I believe,

(1) That every diseased appendix should be removed. This does not mean that any good will come from removing an appendix that is not diseased; and our diagnosis must be complete and searching enough to fix the responsibility squarely on the appendix.

(2) That every acute case of appendicitis should be operated upon early, before grave complications develop, and the earlier the better.

(3) That the favorable results from operation refer to the early, not to the late cases. Safety is in direct ratio to the promptness with which the operation is undertaken.

(4) That it is not always possible to determine the gravity of a case in its early stages. We can never say that any patient with appendicitis is safe when the appendix is allowed to remain in. Many cases of gangrenous appendicitis have mild symptoms and obscure signs in the commencement of the attack.

(5) That in case of doubt, as at times there must inevitably be such cases, it is safer to operate than not.

(6) That these deductions form the basis on which appendicitis must be treated, if successfully, and that a departure from them will mean an inevitable increase in mortality.

Stuart Circle Hospital.

DISCUSSION.

DR. G. P. LAROCHE emphasized the importance of withholding food and cathartics from patients with any kind of abdominal pain unless accompanied with

diarrhea. In a series of 100 of his cases, there was not a single patient who had not taken a cathartic.

Twenty years ago, Ochsner stated that, whenever possible, operation should be done within the first twenty-four hours. When this was not possible, operation should be delayed. Occasionally, patients with an abscessed appendix are comparatively free of pain. On the other hand, little inflammation is found frequently in cases of much pain. Therefore, we cannot consider the clock.

In another series of 100 cases, Dr. LaRoque was able to carry patients through with morphine and plenty of water, but no food or cathartics.

DR. GARNETT NELSON does not believe that any one can foretell the condition of the appendix from the outside. If it can be proven that some other condition exists, it might be well to postpone operation; but if not, it is best to operate. He cited a gangrenous case, wherein he thought that rupture was certain. He thinks that Dr. LaRoque is in error.

DR. J. N. UPSHUR believes in the promptest operation possible. All of the trouble he has seen in this disease has been due to delayed operation. He cited the case of a boy who had all the symptoms of appendicitis, and a consultant called to see the boy was confident the diagnosis was correct, but, the symptoms having abated somewhat, operation was delayed and calomel given. The next day, the patient had improved, and has never had another attack.

Another case was that of a woman, six months' pregnant, who had had pain for two weeks, her attending physicians making a diagnosis of appendicitis. Dr. Upshur, doubting the diagnosis, ordered a purgative and an enema, whereupon there was an enormous evacuation, and the patient made an uneventful recovery. Ten days later, she had premature labor, but has never had recurrence of the pain. He thinks that in these two cases the symptoms were due to pressure of large fecal accumulations on the cecum.

DR. ST. GEO. T. GRINNAN asked Dr. Robins if he is always able to distinguish between acidosis and appendicitis in children. He has seen several cases in which diagnosis was doubtful.

DR. ROBINS, closing the discussion, stated that he had made no attempt to cover the whole subject of appendicitis. His reason for writing the paper was that many wrong ideas were apparently beginning to be held on the subject. It had been established by abundant clinical experience that prompt operation in the beginning of the attack is followed by almost universal recovery. This has removed the fear of death but it will be found that, when this principle of immediate operation is abandoned, there will be a mortality rate that is quite different. The tendency to delay is dangerous and favorable statistics cannot be secured in delayed cases. Waiting a day or two to see if the patient had not improved allows the favorable opportunity for operation to be lost. The object of the paper therefore was to impress the gravity of delay.

Correspondence.

Topics of the Times.

Richmond, Va.,
December 6, 1923.

TO THE EDITOR:

I enclose a clipping, "Topics of the Times," from the editorial page of *The New York*

Times of December 3. *The Times* has been such a consistent friend of the regular medical profession that it seems to me it might be wise to reproduce in the VIRGINIA MEDICAL MONTHLY this editorial comment. The last paragraph of the editorial comment is particularly striking.

If the public could only understand that there is no such thing as "allopathic" doctors, and that the regular doctor has a perfect right to use any remedy he sees fit, we would go a long way toward establishing scientific medicine on a satisfactory basis. When, however, an overwhelming majority of both houses of our legislature, under pressure of lobbyists representing all the imaginable cults, is willing to override our State Board and put through such measures as a special bill to exempt men like De Collard from the jurisdiction of the State Medical Examining Board, and to establish a "School of Poropathy," the task of trying to uphold a standard of scientific medicine is most discouraging.

Is it not time that each doctor should act upon what he or she professes to believe—that the profession of medicine is the noblest possible calling—and resent the contemptuous treatment that is heaped upon the medical profession by many politicians and business men? Elections will be coming on before long. Let each doctor interview the prospective candidate for office and find his attitude about regular medicine and public health measures. It is a strange inconsistency and a straddling of both sides of the issue when a legislator votes for a sentimental appeal for an appropriation for the crippled children's hospital on the one hand, and on the other hand supports a measure to establish some of the cults.

If the doctors themselves would take more interest in such measures, the politicians would not be so contemptuous of the work of the regular medical profession after the election is over.

Sooner or later public sentiment will be aroused by such miserable occurrences as happened in Connecticut and elsewhere, when incompetent and untrained eclectic doctors have been the cause of suffering and death. If the public press would only take the attitude of *The New York Times*, what an enormous help it would be to the people of this State!

J. SHELTON HORSLEY, M. D.

This excellent newspaper states:

HERE IS A CHANCE FOR REFORM

Connecticut's highly commendable campaign against quack doctors, and its reverberations in other States, almost warrant the hope that success might attend an immediate and earnest attempt to change the medical practice laws all through the country. And no laws need changing more. Thanks to the abysmal ignorance in medical matters which characterizes a majority in our legislative bodies, statute books show how well the quacks have been able to win confidence in the two delusions on the acceptance of which their legal right to do business must rest. The first of these is that nothing is "medical practice" except the administration of drugs, and the second is that there are and must be "schools" of medicine, each equally efficient and each entitled to bestow upon its representatives the title of doctor.

Not all who believe those two propositions are insane, and not all who uphold one or the other of them is a conscious swindler. But both are grotesquely false, and the legislators who have treated them as true are responsible for the scandals just revealed in Connecticut. They are to blame for the absurd fact that in most of the States there are several boards, each empowered to examine candidates and grant licenses.

This means that several quackish cults can send "graduates" of their so-called colleges and diploma mills before men of like mind who will turn them loose on the public to minister to the sufferers from all kinds of diseases, and in almost every instance to use in dealing with conditions widely different the single expedient—usually some form of suggestion or massage—with which alone they have been equipped.

ONLY ONE BOARD IS NEEDED

In no State should there be more than one medical examining board, and that one alone should issue licenses to practice medicine. Its members would not belong to any "school." They would be men of real medical education themselves, able to distinguish between a real medical college and a diploma mill—between a real doctor and a quack. They would know that a real doctor is one who has acquired a decent knowledge of all the many means by which disease, by himself or others, can be prevented and cured if curable. They will be ready to use suggestion or the manipulation of bones or viscera in cases demanding it—as ready as they are to administer drugs when drugs are needed or to trust wholly to diet and outdoor life in the not infrequent instances when nothing more is required or can be done with any expectation of benefit.

Not one of the men licensed by such a board would claim universal efficacy for any form of treatment. Whoever does that is instantly revealed as a quack, either ignorant or dishonest, and he is not any the less a quack because he can produce "testimonials" from grateful patients, including the familiar legislator whose close relative was saved from fast-approaching death by an "irregular" after he, or more often she, had been given up by anywhere from one to a dozen "regular" doctors.

The number of people, otherwise intelligent, who thus can be deceived and with the best of intentions can deceive others as gullible as themselves is disgracefully and humiliatingly large.

—N. Y. Times.

Why Put Higher Tax Levy on Railroads?

Warrenton, Va.,

December 17, 1923.

TO THE EDITOR:

I am reliably informed that our Congress is trying to put a higher tax levy on the railroads. This in my opinion is a grave mistake of judgment. It is plainly unwise to further tax a utility already bearing a bit too much tax. Mr. Mellon tells us that a lowered taxation on every thing will not only meet all the requirements of the Government but leave a surplus of millions. And it is my impression that Mr. McAdoo expresses the same opinion.

The railroads are now crowded with carriers, giving us reasonable rates and quick and safe service. Why make them pay more tax when the revenue now exceeds the running expense of the Government? It would be far better to lower their taxes and through leniency induce them to put new lines in undeveloped territory, and thereby encourage increased thrift and prosperity. The increased prosperity would tend to lower, not raise, our taxes.

All physicians should be interested in this matter. They should feel it their duty to write our representatives in Congress and try to prevail upon them to vote against all bills offered to place more taxes on the railroads. The people at large should do the same.

STEPHEN HARNSBERGER, M. D.

Proceedings of Societies

Virginia State Board of Medical Examiners.

At the meeting of the State Board of Examiners held in Richmond, December 11-14, 1923, the following doctors were granted licenses to practice medicine in Virginia:

- Dr. W. J. C. Agnew, Washington, D. C.
- Dr. E. G. Bauersfeld, Frederick Junction, Md.
- Dr. F. J. Clements, Fork Union, Va.
- Dr. A. A. Creecy, Norfolk, Va.
- Dr. Ernest Flehme, Philadelphia, Pa.
- Dr. Geza Frank, Brooklyn, N. Y.
- Dr. Emily Gardner, Richmond, Va.
- Dr. J. M. Gaines, Alexandria, Va.
- Dr. C. E. Hawks, Brook Hill, Va.
- Dr. P. L. Hill, Gaffney, S. C.
- Dr. S. P. Hileman, Richmond, Va.

Dr. C. E. Houston, Virgilina, Va.
 Dr. T. D. Jones, Charlottesville, Va.
 Dr. J. W. Kirk, Philadelphia, Pa.
 Dr. C. A. Luck, Danville, Va.
 Dr. W. B. Meares, Jr., Richmond, Va.
 Dr. J. J. Olinsky, Norfolk, Va.
 Dr. R. J. Neff, Charlottesville, Va.
 Dr. C. W. Scott, Charlottesville, Va.
 Dr. R. G. Waterhouse, Jr., Richmond, Va.
Richmond Academy of Medicine and Surgery.

At a meeting held on November 27th, the President, Dr. J. Allison Hodges, in the chair, Dr. Mark W. Peyser, Secretary, a new constitution and by-laws was adopted to go into effect at the first meeting in December.

The name of the organization is changed to the Richmond Academy of Medicine, the offices being a presidency, two vice-presidencies and a secretary-treasurership. A Board of Trustees, composed of the five most recent past-presidents, names the secretary-treasurer and the Committee on Discussions, which is the only permanent committee, and considers all the business, bringing to the attention of the Academy only those matters it deems of sufficient importance. This will permit the Academy to devote its time to consideration of scientific matters, doing away with audiences for outside matters.

Dr. Carrington Williams read a paper on and reported a case of, *Diverticula of the Large Bowel Complicated with Carcinoma*.

Dr. Chas. R. Robins read a paper entitled *Present Day Attitude Toward Appendicitis*, which was discussed by Drs. G. P. LaRoque, Garnett Nelson, J. N. Upshur, St. Geo. T. Grinnan and Robins (see paper and discussions on page 714.)

Dr. W. H. Higgins read a paper entitled *Clinical Significance of Hunger Pains*, which was discussed by Drs. J. Shelton Horsley and Higgins.

At the meeting held on December 11th, election of officers was held and Dr. Fred M. Hodges was elected president, Drs. Arthur S. Brinkley and William H. Higgins vice-presidents. The secretary-treasurer is to be chosen by the board of directors. In accordance with the plan to divorce business from the scientific meetings, standing committees were dissolved and all business will hereafter be handled by the board of trustees. This is com-

posed of Dr. Virginius Harrison, Dr. James K. Hall, Dr. Garnett Nelson, Dr. Thos. D. Jones, and Dr. J. Allison Hodges. Upon installation of Dr. Fred Hodges as president at the January meeting, he automatically succeeds Dr. Virginius Harrison as a member of the board.

The year just completed has been one of the most successful in the history of the Academy, due largely to the hard work of the retiring president, Dr. J. A. Hodges, and the interest displayed by members.

MARK W. PEYSER, *Secretary*.

The Southside Virginia Medical Association

Held its eightieth session in Petersburg, December 11, with a splendid attendance. Many excellent papers were read and freely discussed, perhaps the most interesting being that of Dr. Guy R. Harrison, of Richmond, whose subject was "The Borderline of Medicine and Dentistry." The active interest shown by the members of the Southside in the problems of the allied profession of dentistry marks a new and very important step forward in the progress of the medical and dental professions of Southside Virginia.

The following officers were elected for 1924: President, Dr. George H. Reese, Petersburg; vice-presidents, Dr. W. E. Anderson, Farmville, Dr. R. H. Manson, McKenney, Dr. Cora Z. Corpening, Suffolk, and Dr. M. H. Tredway, Emporia; secretary-treasurer, Dr. R. L. Raiford (re-elected), Sedley. Members of the Executive Committee are Drs. E. L. Kendig, Victoria, J. E. Rawls, Suffolk, and C. S. Dodd, Petersburg; members of the Nominating Committee are Drs. J. B. Jones, Petersburg, W. C. Harmon, Dolphin, and D. C. Mayes, Church Road. Drs. D. D. Talley, Frank S. Johns, and Guy R. Harrison, Richmond, were elected to honorary membership in the Association.

The Association adjourned to meet in Suffolk, in March, 1924.

R. L. RAIFORD, *Secretary*.

The Southampton County (Va.) Medical Society

Held its annual meeting in Courtland, on the afternoon of December 14. The following officers were elected for the coming year: President, Dr. S. J. Railey, Handsom; vice-presidents, Dr. J. C. Rawls, Franklin, and Dr. J. N. Applewhite, Capron; secretary-treasurer, Dr. R. L. Raiford (re-elected), Sedley. The next meeting is to be held in April.

The Society adopted resolutions unanimously endorsing a Health Unit for Southampton County, such as is being operated in other counties of the State.

The Warwick County (Va.) Medical Society,

At its annual meeting on December 11, elected Dr. C. B. Courtney, Newport News, president, and Dr. A. D. Ownbey, also of Newport News, secretary-treasurer. Resolutions were passed endorsing the Lye Legislation Bill of the Medical Society of Virginia. Other County Societies are urged to do likewise and to send such resolutions or letters to Hon. E. W. Milstead, of Newport News, who will be the patron of this bill in the State Legislature.

The Dinwiddie County (Va.) Medical Society,

At a recent meeting, elected the following officers for the ensuing year: President, Dr. C. S. Dodd, Petersburg; vice-president, Dr. D. C. Mayes, Church Road; secretary-treasurer, Dr. William C. Powell (re-elected), Petersburg. Dr. F. J. Wright, Petersburg, was elected delegate and Dr. J. M. Harwood, also of Petersburg, alternate, to the House of Delegates for the Staunton meeting of the Medical Society of Virginia.

WILLIAM C. POWELL, *Secretary*.

The Truth About Medicine

In addition to the articles enumerated in our letter of October 27th, the following have been accepted:

Abbott Laboratories
Butesin
E. Bilhuber, Inc.,
Afenil
Ampules Afenil
Cutter Laboratories
Diphtheria Antitoxin Globulin
Glycerinated Vaccine Virus
Gonococcus Vaccine
Hoffmann-LaRoche Chemical Works
Iodostarin
Chocolate Tablets Iodostarin-Roche,
Chocolate Tablets Iodostarin-Roche 0.25 Gm.
Parke, Davis and Co.
Carbon Tetrachlorid (Human Use)—P. D. & Co.

NEW AND NONOFFICIAL REMEDIES.

Butesin.—*n*-butyl-para-aminobenzoate. Butesin is the normal butyl ester of 4-aminobenzoic acid. The actions and uses of butesin are similar to those of benzocaine (anesthesin), which is the ethyl ester of 4-aminobenzoic acid (see New and Nonofficial Remedies, 1923, p. 41, Anesthetics, Local, Difficultly, Soluble). Butesin is used as a dusting powder, either pure or diluted. It may be used in the form of troches, ointment, suppositories or dissolved in a

fatty oil. Butesin is a white, crystalline powder, odorless, tasteless, almost insoluble in water, but soluble in alcohol, chloroform, ether and in fatty oils. The Abbott Laboratories, Chicago. (Jour. A. M. A., Nov. 3, 1923, p. 1523).

Diphtheria Antitoxin Globulin. This product (see New and Nonofficial Remedies, 1923, p. 283), is also marketed in syringes containing 20,000 units. Cutter Laboratory, Berkeley, Calif.

Glycerinated Vaccine Virus. This product (see New and Nonofficial Remedies, 1923, p. 293), is also marketed in packages containing one capillary tube. Cutter Laboratory, Berkeley, Calif.

Gonococcic Vaccine. A gonococcic vaccine (see New and Nonofficial Remedies, 1923, p. 304), marketed in vials of 5 c.c. and 20 c.c., each cubic centimeter containing 500 million cocci. Cutter Laboratory, Berkeley, Calif. (Jour. A. M. A., Nov. 17, 1923, p. 1693).

Afenil.—Calcium chloride urea. A molecular compound of calcium chloride and urea. Afenil has the actions of calcium chloride. It is claimed that when afenil solutions are administered intramuscularly or intravenously, the drug is better tolerated and less irritating than calcium chloride. It is claimed that the intravenous administration of afenil is indicated in hay fever, asthma and other diseases of the respiratory tract in anaphylactic conditions, skin rashes, urticarias and as a means of preventing severe arsphenamine reactions. Afenil is marketed in ampules containing 10 c.c. of a 10 per cent. solution of afenil. E. Bilhuber, Inc., New York.

Silver nitrate solution in capsules. P. D. and Co. An aqueous solution of silver nitrate contained in capsules composed of beeswax with an inner lining of a hard paraffin. The solution is intended for the prophylaxis of ophthalmia neonatorum in the newborn. The solution is marketed in two forms: capsules containing 6 minims of a 1 per cent. solution, capsules containing 6 minims of a 2 per cent. solution. Parke, Davis and Co., Detroit. (Jour. A. M. A., Nov. 24, 1923, p. 1789).

PROPAGANDA FOR REFORM.

The Menace of "Moonshine" Whisky. The untoward results of overindulgence in whisky have usually been ascribed to its alcoholic content, although now and then ill-defined "by-products" of fermentation present in the distillate have been charged with a toxicity out of all proportion to the quantities ordinarily present. The indefinite "fusel oil" and furfural were often designated as the pernicious ingredients. In properly made and suitably aged whiskies, such constituents could at most play only a minor part in the intoxication produced. While alcoholism is less prevalent today than it was a few years ago, its attendant and after effects on its victims are more serious. The impression is broadcast that this is due to the "moonshine" liquor which is being distributed. The danger from the presence of methyl alcohol in "moonshine" whisky is well-known. Its presence is explained by the use of denatured alcohol (which may contain methyl alcohol) in the preparation of "moonshine" whisky. However, the investigation of the federal authorities indicates that ordinarily methyl alcohol is not the pernicious constituent of illicit whisky, but instead the product has been found often to contain a high proportion of acetaldehyd. The "ranker" the liquor, the higher the aldehyd content. (Jour. A. M. A., Nov. 10, 1923, p. 1611).

Pregl's Solution. It has been stated that Pregl's (isotonic) iodine solution is probably prepared by

treating a solution of sodium carbonate with finely powdered iodine. When the iodine has dissolved, sodium chlorid is added and the solution diluted to a definite volume. The product is stated to contain sodium ions, free iodine, iodide ions, hypoiodite and iodate ions—this in addition to the carbonate and chlorid. A proprietary brand of this solution is sold in Germany as "Presoid." All favorable reports of the therapeutic use of Pregl's solution have had their genesis from apparently biased sources. (Jour. A. M. A., Nov. 10, 1923, p. 1628).

Iridinol.—The Council on Pharmacy and Chemistry reports that about fifteen years ago "Iridium (Medicinal)" was put on the market by the Platinum Co. of America, and the same company manufactured "Iridinol" which was marketed by the P. H. Potter Chemical Co. (now P. H. Potter and Sons, Inc.), New York. Both products were, at that time, claimed to contain iridium and were marketed for a high price with grossly misleading claims for the efficacy of iridium as a therapeutic agent. Iridium (Medicinal) seems to have been abandoned, but Iridinol, advertised by P. H. Potter and Sons, Inc., as an "ethical preparation" continues to be sold. In the earliest advertising Iridinol was claimed to be a "nontoxic preparation of iridium." At that time the A. M. A. Chemical Laboratory was unable to detect the presence of iridium, and it was concluded that no very large amounts of iridium could have been present. Regardless of the presence or absence of iridium, there is not the slightest evidence for the therapeutic value of this metal in the conditions for which it is recommended by the exploiters of Iridinol. In the present advertising for Iridinol no definite claim is made for the presence of iridium. Instead, the agents merely imply its presence. Iridinol is recommended by the exploiters in anemia, rheumatism, specific blood diseases, diseases of the nose and throat, of stomach organs, liver and kidneys, of the nervous system, diseases of children and as a systemic alterative. In view of the long-continued activities of P. H. Potter and Sons, Inc., for the use of Iridinol, the Council authorized publication of a report for the information of physicians who may be importuned to use it. (Jour. A. M. A., Nov. 24, 1923, p. 1807).

Whooping Cough Vaccine. In a series of articles on biologic therapy prepared under the auspices of the Council on Pharmacy and Chemistry, W. C. Davison (The Journal, Jan. 22, 1921, p. 242), concluded a review of the use of pertussis bacillus vaccine thus: "In summing up the prolific and somewhat contradictory literature on this subject, it may be concluded that injections of Bordet-Gengou bacillus vaccines may have a slight though unreliable prophylactic effect, and that therapeutic inoculations are of practically no value. Further experiments are necessary to raise this procedure from the limbo of non-specific therapy." The Council on Pharmacy and Chemistry has accepted pertussis bacillus vaccine for New and Nonofficial Remedies, but states in regard to the usefulness of the product: "The evidence indicating that it is of value for either prevention or treatment is very questionable, and the reports are conflicting." (Jour. A. M. A., Nov. 24, 1923, p. 1809).

Public Health Students to Visit Richmond Bureau of Health.

Dr. Allen W. Freeman, a former Richmonder and head of the School of Public Health Administration at Johns Hopkins University, Baltimore, has announced that a number of the students of the school of hygiene and public health will be sent to Richmond this winter to study the operations of the local bureau of health, records of this department being considered especially good.

To Improve Quality of Carbonated Beverages.

The American Bottlers of Carbonated Beverages have established a research fellowship at Iowa State College, Ames, Iowa, to train scientific workers who may have access to a well equipped laboratory, the object being to improve the quality of carbonated beverages, commonly known as soda water. This is receiving the hearty approval and commendation of experts on food production, including U. S. Government officials engaged in advisory and regulatory work in connection with Pure Food Laws.

Annual Report of the U. S. Public Health Service,

For the fiscal year ending June 30, 1923, covering the one hundred and twenty-fifth year of the existence of the Public Health Service, indicates that general health conditions throughout the United States have continued as satisfactory as in recent years. Also, an increasing interest in Public Health improvement has been noted. The need for new marine hospitals and the difficulty of securing medical officers for the regular corps of the Service are stressed. Twenty-five hospitals are now operated by the Service, including the National Leprosarium at Carville, La.

A novel feature of this report deals with the use of the radio for dissemination of popular health information and the stimulation of greater interest in general health matters. The U. S. Service was the first national health agency to make use of the radio for this purpose, having inaugurated this service July 13, 1921. Its actual cost has been insignificant.

Don't forget to look over the advertising pages before you put down the journal. Patronize our advertisers whenever possible.

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B. R. TUCKER, M. D., Richmond, Va. P. W. HOWLE, M. D., Richmond, Va.

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ALEX. G. BROWN, Jr., M. D.,
Editor.

AGNES V. EDWARDS,
Business Manager and Secretary-Treasurer.

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Editorial

Diseases of Gall Bladder and Bile Ducts.

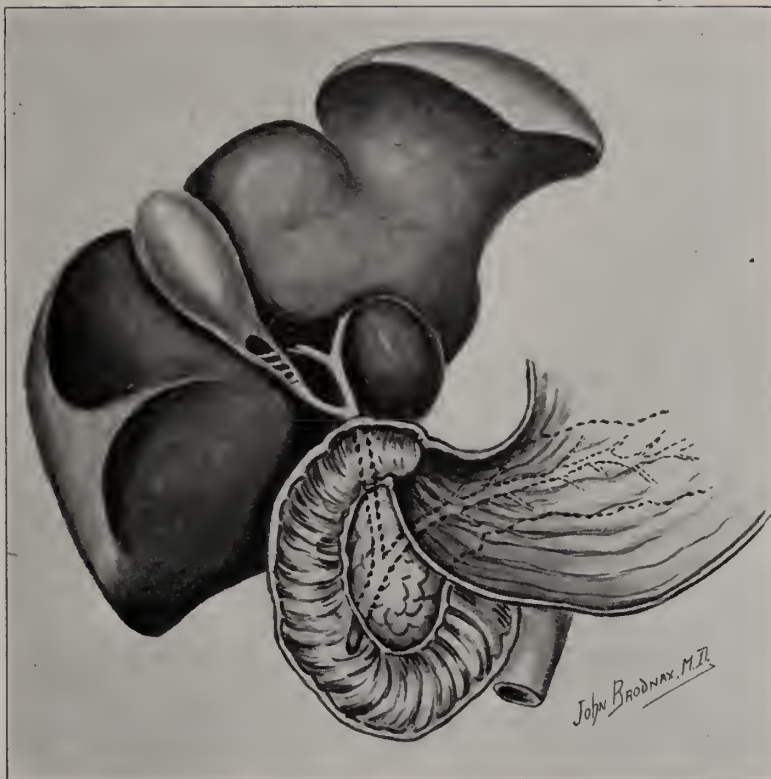
The occurrence of symptoms originating in dysfunction disease of the gall-bladder and bile ducts is very common. Much of this symptomatology has been covered, in its initial forms, by the terms "biliousness" and "torpid liver," and the like. For such conditions our forefathers in medicine prescribed massive doses of calomel and, in more recent times, "broken doses of calomel" have been widely prescribed. These disturbances of digestive processes, resulting from a dysfunction of the stomach, duodenal, biliary or pancreatic action which culminate in the state called biliousness or torpid liver, may or may not be related to the disease of the gall-bladder and biliary ducts. No doubt, liver cells receiving blood laden with food products from the portal vein and with blood from the hepatic artery, to say nothing of the lymphatic fluids, are continuously secreting bile, at a more or less normal rate, during the period of so-called torpidity. The flow of bile is probably only obstructed when ejection is to occur from the gall-bladder and common ducts into the duodenum as the acid chyme passes over the mucosa at the site of the ampulla of Vater. The more or less persistent introduction of food products into a tract which is dysfunctioning results in this "bilious" state.

Patients, who are fat and forty, with the history of years of periodic headaches, with recurrent "stomach attacks" characterized by

pain in epigastrium, gas eructations after taking food, "heart-burn," "sour stomach," probably are well along in an established pathology of the gall tract, or some other viscus in upper alimentary tube. These patients are numerous. They have many disquieting symptoms. They have mild and severe pains; they have gas eructations; "sour stomach;" nausea; loss of appetite; attacks of "biliousness;" sometimes jaundice; constipation; flatulence. The more severe grades of bile tract infection and dysfunction are characterized by chills and fever, and more active symptoms of a systemic nature. It is with a view to the brief consideration of these types of bile tract infection that our readers are asked to consider these comments.

The quantity of bile secreted daily varies from one to two pints. It is secreted continuously by the liver cells and flows through the biliary ducts to the common duct where the flow is obstructed by the sphincter. The gall-bladder is filled probably between periods of digestion. Ejection of bile into the duodenum takes place during the time of digestion. It is yellow to golden yellow in color. It is darker in color at times and sometimes is greenish. It is stimulated in quantity by any agent that causes hemolysis of the red corpuscles; it is increased in amount by bile itself; its flow is increased also by "secretion" or by the pancreatic "hormone."

Inflammation of the gall tract, including gall-bladder, cystic duct, common duct and biliary ducts, is very common, as above stated, and it is rather difficult to make a hard and fast differentiation between cholecystitis and cholangitis. Cholecystitis is usually accompanied by cholangitis. The inflammatory process in the mucosa results from the implantation and proliferation of bacteria. These microorganisms may reach the gall tract by two general routes. They may enter from the blood in such acute conditions as pyemia, septicemia, pneumococcus-emia, influenza, and from such chronic foci as tonsil and teeth infections. They may enter, also, by the alimentary route in such conditions as appendicitis, ulcerations in the intestines, typhoid fever and such like. The question whether the migrating organisms travel by the portal blood stream or by the hepatic artery is not settled; but it is probable that infection may reach the gall-



Drawing by Dr. John Brodnax, Department of Anatomy, Medical College of Virginia.

bladder and bile ducts by both avenues. Once there is an infection, there is set up a disturbance in the flow of bile, its ejection and retention in the bile ducts and gall-bladder. For many years in this infection the typhoid bacillus and colon bacillus were recognized as the most common and frequent offenders.

More recently, Rosenow's work in this connection is very interesting and should be considered as a noteworthy contribution to the etiology of cholecystitis. Rosenow has shown that the non-hemolytic streptococcus is a frequent cause of cholecystitis. Strains of this streptococcus from the tonsils appear to have a selective action for gall-bladder. The pneumococci may produce cholecystitis, seen not infrequently in pneumonitis, but sometimes without it. To these we may add the following organisms: *Streptococcus haemolyticus*, *staphylococcus*, *Bacillus influenzae*, and others. Implantations of bacteria set up forms of cholecystitis of various degrees of severity and pathology. But all forms, whether acute or chronic, have a beginning stage of more or less mildness, giving rise to quite mild disturbance of function or systemic symptoms.

Catarrhal Cholecystitis: In this initial gall-bladder disease one might note only microscopic leukocytic and lymphocytic changes while macroscopically the structures appear normal. But such microscopic change in the mucous membrane of gall-bladder and ducts is quite sufficient to set up disturbance in the flow of bile and in its constituents. As the mucous membrane assumes grosser pathology, the perversion of bile becomes more marked and deposition of cholesterolin may be the beginning of the formation of stone. This acute non-suppurative cholecystitis causes thickening of mucosa and swelling of it, blocking the cystic duct, frequently. In acute non-suppurative cholecystitis, the onset may be sudden, entering the clinical picture as a part of a systemic disease. Such symptoms as pain, tenderness, rigidity of right rectus, are common. If obstruction occurs, the gall-bladder may be outlined by palpation. The patient usually exhibits jaundice, vomiting, rapid heart action, fever and leukocystitis.

Suppurative Cholecystitis: Acute suppurative cholecystitis is an advanced and progressive stage of what has just been briefly out-

lined. This type is usually associated with that degree of aggravation and chronicity as is found in gall-stones. The general symptoms are much the same, only more violent. The only treatment of this condition is surgical, unless the case is a poor surgical risk. In this case some advantage may be gotten for the patient by medical measures. One may readily recall the local clinical signs. They are much the same, while the constitutional symptoms are more marked. The facies of the patient is more significant of severe pathology; the pulse and fever increase in rate and degree; the spleen enlarges; the kidneys show signs of acute inflammation. The pancreas may, also, give evidence of associated pathology, with deep body pain, loose bowel movements, possibly with free fat. There may be glycosuria.

Chronic Cholecystitis: This form of gall tract infection is slow, insidious, and often is difficult to unearth—unless brought to the fore by an acute exacerbation. It is a progressive development of established catarrhal cholecystitis. In such cases the gall-bladder is often adherent to surrounding viscera and the mucous membrane is destroyed, being supplanted by cicatricial tissue, in the most aggravated forms. The infection and inflammatory processes are found to invade lymphatic system and involve the pancreas at its head. In such gall-bladder cases, the symptoms are characterized by recurrent attacks of pain. This pain of biliary colic is usually caused by the presence of gall-stones. Gall-bladder attacks of pain may occur without gall-stones, however. Adhesions and chronic changes in the gall-bladder set up a gastric syndrome in which pain is no inconsiderable feature, although other symptoms of stomach disorder are found, such as gas eructation, pyrosis, epigastric oppression, nausea, and constipation. The gastric secretory function as well as the gastric motor function are decidedly at fault in this form of gall-bladder disease. In addition one may expect associated systemic disturbances, such as multiple arthritis, neuritis, myocarditis, nephritis, and high blood pressure signs.

Pericholecystitis: The peritoneum covering the gall may become involved in the pathology.

Acute inflammation of peritoneum results from extension of virulent infection within the viscus. It may occur also from perforating gastric ulcer. The chronic adhesions in this region result from recurrent cholecystitis with

or without gall-stones. This condition may set up complications in the intestines by formation of a kink or constriction. The gall-bladder area of pain at the right of the spinal column, between seventh and tenth ribs, is thought to bespeak pericholecystitis with adhesions.

Catarrhal Jaundice: This may result from gastro-intestinal disturbances, such as occur from indigestion of food, acute poisons, acute infections, acute duodenitis. The swelling of the mucosa of duodenum, in the region of the biliary papilla, may produce some occlusion of the bile duct; jaundice results. Acute pancreatitis may also produce catarrhal jaundice by compression on common duct. This and other conditions may produce catarrhal jaundice. One would feel that all such cases are due to a microbic infection, although no specific organism has been found.

This condition is more often met with in the young. Its onset is gradual, usually following some definite gastro-intestinal disturbance. There occurs icterus in the sclera; jaundice of face, extremities and trunk follow. The temperature is moderate and the pulse is slow. There are the dry, clay-color-stools. The urine shows bile pigment. In severe forms, pancreatitis, nephritis, hepatitis may occur, with clinical evidence.

Suppurative Cholangitis: This is also of microbic origin. The bacillus coli, bacillus typhosus and paratyphosus, streptococcus, staphylococcus, pneumococcus are the common causes of cholangitis. One must not forget Rosenow's work on the selective action of organisms, found in chronic disease of tonsils and teeth, for the gall tract.

The gall tract, composed of the common duct, intrahepatic and cystic ducts, is affected. The gall-bladder may be and usually is involved. The ducts are dilated, their walls are infiltrated. The liver is enlarged; hepatitis exists; abscess formation may follow. Infection, traveling by lymphatics, or by continuity, may involve the duct of Wirsung and other adjacent structures. The symptoms are consonant with the pathology. Rigors, sweats, septic range of temperature, prostration, nausea, vomiting, diarrhea, jaundice, pain, enlarged liver, enlarged spleen, distended abdomen, make up a partial list of symptoms found.*

*Reference: Oxford Medicine, Vol. III, Chapter VII.

News Notes

The Seaboard Medical Association of Virginia and North Carolina

Held its twenty-eighth annual meeting in Newport News, Va., December 4, 5 and 6, under the presidency of Dr. Joseph T. Buxton, of that city. The attendance was large. This with the discussion of each and every paper, and two well attended public meetings—one on Medical Education and Health Officers' Training and the other on Child Welfare—made the meeting a phenomenal success.

A resolution was passed memorializing the Legislatures of Virginia and North Carolina to be as liberal to the Departments of Health, as the funds of the respective states will permit, especially continuing venereal disease control, which is distinctly constructive work in the Health Departments of both States. A committee was appointed to co-operate with the Walter Reed Medical Society and the Medical Society of Virginia in the matter of the "Walter Reed Memorial."

Rocky Mount, N. C., was selected as the place of meeting in December, 1924, and the following officers were elected: President, Dr. William E. Warren, Williamston, N. C.; vice-presidents, Dr. James W. Hunter, Norfolk, Va., Dr. George A. Caton, New Bern, N. C., Dr. Robert A. Davis, Newport News, Va., and Dr. B. C. Willis, Rocky Mount, N. C.; secretary, Dr. Clarence Porter Jones, Newport News, Va., and treasurer, Dr. George A. Caton, New Bern, N. C., both of the latter being re-elected.

CLARENCE PORTER JONES, *Secretary*.

The Tri-State Medical Association of the Carolinas and Virginia

Will hold its twenty-sixth annual session in Greenville, South Carolina, on Wednesday and Thursday, February 20-21, 1924. The Imperial Hotel will be headquarters of the Association. A session will be held morning and afternoon and also on the evening of the twentieth. Only forty titles may be placed on the program and the five sessions will give ample time for each paper to be read and discussed. The Association will meet in a single section.

It is hoped that the usual preliminary exercises may be entirely dispensed with and that immediately after the Association has been

called to order the reading of the pages may begin.

The physicians of Greenville have been requested not to attempt to provide entertainments of any kind. The real business of this organization is the diffusion of medical knowledge and the entire time of the meeting will be devoted to that purpose. The Association is not interested as a body in medical or other policies, but its purpose is to make better doctors of its members.

The program is being rapidly formulated and every indication points to a splendid meeting. Four or five invited guests will address the Association.

Dr. Chas. O'H. Laughinghouse, Greenville, N. C., is president; Dr. W. L. Peple, Richmond, Dr. D. A. Stanton, High Point, N. C., and Dr. S. B. Sherard, Gaffney, S. C., vice-presidents; and Dr. James K. Hall, Richmond, secretary-treasurer. Dr. L. O. Mauldin, Greenville, S. C., is chairman of the local committee of arrangements.

Dr. William F. Drewry,

For the past twenty-five years superintendent of Central State Hospital, Petersburg, Va., and one of the best known psychiatrists in the country, has resigned his connection with the State Hospital and accepted the position of city manager of Petersburg, at a salary of \$10,000 a year. He entered upon his new duties on January 8.

It was with a feeling of regret that we first learned of the fact that Dr. Drewry was severing his connection with a work in which he has excelled. However, in his new position, he has undoubtedly entered a field in which he will have broader scope for his excellent talents and it is a pleasure to learn from him personally that he expects to maintain his interest in all things medical—and especially in this his native State. Editorials in our leading dailies have paid high tribute to Dr. Drewry and the great service he has rendered Virginia.

Petersburg is to be congratulated upon her selection of city manager and this Journal extends Dr. Drewry its best wishes for his continued success in his new work.

The Seaboard Air Line Railway Surgeons

Held their annual meeting on board steamship Governor Cobb, en route to Cuba, December 4, Dr. H. H. Bass, Henderson, N. C., sec-

ond vice-president, presiding. At the annual banquet held on the following evening on the roof garden of Plaza Hotel, Habana, the chief surgeon, Dr. Jos. M. Burke, Petersburg, Va., presided as toastmaster. On December 8, on board the steamship Cuba, returning home, the last session of the convention was held. Special resolutions were passed on the death of Dr. R. B. Epting, Greenwood, S. C., who died February 18, 1923, shortly after his election to the presidency of the Association. Dr. Joseph M. Burke, chief surgeon, was presented a handsome 23 jewel Harvard watch and gold chain as a token of affection from the members.

Sarasota, Fla., was selected as the next place of meeting. The following officers were elected for the ensuing year: President, Dr. H. H. Bass, Henderson, N. C.; vice-presidents, Dr. Jack Halton, Sarasota, Fla., Dr. B. J. Wither-spoon, Charlotte, N. C., and Dr. T. M. McDuffee, Manatee, Fla.; member of executive council, Dr. Edward T. O'Connell, Birmingham, Ala. Dr. J. W. Palmer, Ailey, Ga., was re-elected secretary-treasurer.

Dr. Turner S. Shelton

Has been elected a member of the executive committee of the South Richmond Post, No. 187, American Legion.

Members of Nottoway Red Cross Board.

Dr. W. W. Bennett, Blackstone, and Dr. H. G. Carter, Burkeville, have been elected members of the executive committee of the Red Cross Chapter of Nottoway County, Va.

Major Alfred P. Upshur, M. C.,

Of Fort Sam Houston, Texas, spent the holidays with his parents, Dr. and Mrs. J. N. Upshur in Richmond.

Dr. Charles M. Caravati,

Of the class of '22, Medical College of Virginia, returned to Richmond, January 1, after having served as resident interne at Providence Hospital, Washington, D. C., for eighteen months. He is engaged in the general practice of medicine, with offices at 917 Park Ave.

Dr. Dean B. Cole

Announces the opening of offices in Suite 503, Medical Arts Building, Richmond, Va. His practice will be limited to diseases of the chest.

Dr. M. L. Dalton,

Formerly of Floyd, Va., but who is now living in Hinton, W. Va., has just returned from New York City, where he spent several weeks

in post-graduate work at the N. Y. Post-Graduate Medical School and Hospital.

It is interesting to note that Dr Herbert C. Chase, of the class of '10, former University College of Medicine, Richmond, Va., is director in charge of the Medical Department of this school.

Dr. G. R. Faircloth,

Williamsville, Va., is taking up special work in urology at Brady Urological Institute, Johns Hopkins Hospital, Baltimore, Md.

Dr. D. M. Thomasson

Returned to his home in Lynchburg, Va., the first of December, after taking a special course at the New York Post-Graduate Hospital.

The American Congress on Internal Medicine

Will hold its eighth annual clinical session in the amphitheatres, wards and laboratories of the various institutions concerned with medical teaching, at St. Louis, Mo., beginning Monday, February 18, 1924.

Practitioners and laboratory workers interested in the progress of scientific, clinical and research medicine are invited to take advantage of the opportunities afforded by this session.

Address inquiries to the secretary-general, Dr. Frank Smithies, 1002 North Dearborn Street, Chicago, Ill. Dr. Elsworth S. Smith, St. Louis, Mo., is president of the Congress.

Officers in American Legion.

Dr. E. C. Levy has been elected vice-commander, and Dr. J. B. Bullard a member of the executive committee of the Richmond (Va.) Post No. 1, American Legion, for the coming year.

Dr. W. J. Crittenden,

Orange, Va., is spending some time in New York.

Dr. and Mrs. S. M. Yancey,

Harrisonburg, Va., have gone to Lakeland, Fla., where they expect to spend the winter with their children.

Dr. B. M. Rosebro,

Richmond, recently visited Dr. H. B. Melvin, who has been sick at his home in Halifax, Va.

Dr. R. L. Kern,

Of this city, who has been quite ill from blood poisoning, is now much better.

Married.

Dr. George Blight Harrison, Fredericksburg, Va., and Miss Florence Kimbrough Jackson, Lynchburg, Va., December 15.

Dr. Archer A. Wilson, Oxford, N. C., and Miss Amorette E. Barker, Richmond, Va., December. Dr. Wilson was a member of the class of '23, Medical College of Virginia.

Dr. Cyrus E. Hawks and Miss Dorthy Ellen Arnold, both of Richmond, December 7. Dr. Hawks was formerly connected with Catawba Sanatorium, Va., but is now located at Pine Camp, Richmond.

Dr. Hugh C. Henry,

Since 1911 first assistant superintendent at Central State Hospital, Petersburg, Va., has been appointed superintendent of that institution to succeed Dr. William F. Drewry, resigned. Dr. Henry is a native of Charlotte County, Virginia, and a graduate of the Medical College of Virginia. He has been connected with the hospital since 1903 and is recognized as one of the leading alienists of the South.

Dr. Charles M. Edwards,

Richmond, Va., who served in the medical corps of the Army, in the World War, as director of physio-therapy at several army posts, has received an appointment as major in the Officers' Reserve Corps.

A National Conference on Civilian Vocational Rehabilitation

Will be held in Washington, D. C., February 4-8, 1924. Speakers of national prominence from the fields of social work, industrial management, organized labor, and officials actually in charge of rehabilitation in the States, are to address this conference.

The vocational rehabilitation of disabled civilians represents one of the outstanding accomplishments in social, educational, and labor progress of recent years. For over three years, thirty-six states, co-operating with the Federal Government, have maintained an organization for the rehabilitation of those who are vocationally handicapped from accident or disease.

Dr. S. W. Budd,

Richmond, has been elected president of the Virginia Kennel Club, for the ensuing year.

Dr. R. F. Thornhill,

Of Pulaski, recently visited his old home in Culpeper, Va.

Dr. and Mrs. S. W. Brewer

Have returned to their home at Singer Glen, Va., after a visit to Richmond.

"Swat the Quack."

In consequence of the unpleasant publicity which has recently come to some states from improper licensing of doctors, "swat the quack" crusades are being commenced. Texas and New York, it is announced, have both entered upon campaigns to weed out the fakirs and undesirables. Medical Practice Acts have been sufficiently stringent in some states, to keep out many physicians with bogus diplomas and those in other ways unfit for the high calling of medicine. However, this will be a good time for "house cleaning" everywhere.

Dr. Robert S. Carroll,

Medical director of Highland Hospital, Asheville, N. C., is spending a year traveling and studying in Europe and the Orient.

Dr. R. L. Raiford,

Sedley, Va., is spending the winter in New York City, taking a course in eye, ear, nose and throat work.

Dr. George T. Divers

Has recently moved into his new hospital at Stuart, Va. This hospital, which will accommodate about fifty patients, has been made modern in every respect.

Dr. Florence E. Kraker,

Philadelphia, who has just returned from a year in China where she was on the teaching staff of the Margaret Williamson Hospital, at Shanghai, has been appointed specialist in maternal hygiene in the Children's Bureau of the U. S. Department of Labor. Dr. Kraker was for sixteen years a member of the teaching staff of the maternity department of the Woman's Medical College of Philadelphia, during the latter years of her work there being professor of clinical obstetrics.

Dr. A. R. Gray,

Bentonville, Va., who has been quite sick for the past four months is now able to be out again.

1922 Death Rates.

The Department of Commerce, through compilations made by the Bureau of the Census, announces that the mortality rate for the registration area in 1922 was 11.8 per 100,000 population against 11.6 in 1921. Virginia was

one of the six States showing a lower rate for 1922 than for 1921.

In the registration area of the United States, it was shown that there was a decrease in number of deaths from tuberculosis, in deaths of mothers from childbirth or puerperal causes, and in deaths from typhoid fever. In fact, the rate for deaths from typhoid fever was the lowest ever shown for the registration area. There was an increase in the number of deaths from diabetes and cancer.

Staunton Kiwanians Honor Doctors.

The committee of tellers of the Staunton, Va., Kiwanis Club, although not required to do so by the constitution and by-laws, in the recent election of officers declared among others, the election of Dr. T. M. Parkins as poet and Dr. Guy R. Fisher as artist.

Sir Auckland Geddes Resigns.

Sir Auckland Geddes, British ambassador at Washington, has resigned his post, due to bad health, and will not return to America. As a physician and a man interested in scientific research, he has made many friends among American physicians who will regret to note his retirement.

Fire at Insane Hospital in Chicago.

On the night of December 26, fire destroyed a frame structure used for tubercular patients at the Chicago State Hospital, at Dunning, and seventeen patients were burned to death or suffocated. The financial loss was estimated to be \$100,000.

The Southern Surgical Association

Held its annual meeting at White Sulphur Springs, W. Va., the middle of December, under the presidency of Dr. James F. Mitchell, of Washington, D. C. It was decided to hold the next meeting in Charleston, S. C., December 9, 10 and 11, 1924. The following officers were elected: President, Dr. Le Grand Guerry, Columbia, S. C.; vice-presidents, Dr. J. M. Mason, Birmingham, Ala., and Dr. John T. Moore, Houston, Tex.; secretary, Dr. H. A. Royster, Raleigh, N. C., and treasurer, Dr. Urban Maes, New Orleans, La. Both of the latter held over on unexpired terms.

Virginia Doctor Honored.

We are much interested to note that, at the recent meeting of the Southern Medical Association in Washington, D. C., Dr. A. I. Dodson, of St. Elizabeth's Hospital, Richmond, received one of the three awards made for scien-

tific exhibits. It is especially notable that Dr. Dodson was the only individual to whom an award was given, the other two recipients of awards being the Department of Pathology of the Medical School of Vanderbilt University, Nashville, Tenn., and the Medical Department of the U. S. Army, through the Army Medical Museum.

Dr. Dodson is to be congratulated on his achievement, and especially in view of the fact that there were a number of scientific exhibits, many of them of a very high character.

The American Association for the Study of Goiter

Is to hold its annual meeting January 22, 24 and 25, at Bloomington, Ill., under the presidency of Dr. E. P. Sloan, of that city. Dr. J. D. Moschelle, Odd Fellows Building, Indianapolis, Ind., is secretary of the Association. Operative clinics will be held in connection with the meeting.

The primary object of this Association is to bring together each year men who will present the best that has been "thought, said and done" about goiter and its associated problems. Members of all State medical societies are invited to attend this meeting.

Dr. Swanson Loses Home by Fire.

The home of Dr. W. T. Swanson, in Pittsylvania County, Virginia, was destroyed by fire on the night of December 16, practically everything in it being lost.

Dr. Frederick Gochnauer,

Upperville, Va., was elected adjutant of the Dr. Thomas Lee Settle Camp, C. S. V., at their annual meeting held in Upperville, the last of December.

Dr. Chas. J. Terrell,

Hewlett, Va., left in December for Orlando, Fla., in which place he expects to spend several months.

Dr. Wyatt S. Beazley, Jr.,

A member of the class of '23, Medical College of Virginia, who is now one of the resident internes at St. Francis Hospital, Jersey City, N. J., spent the Christmas holidays with his parents, Dr. and Mrs. W. S. Beazley, in Richmond.

Dr. Sidney L. Scott,

Fredericksburg, Va., was recently elected president of the Kiwanis Club of that place, for the ensuing year.

Dr. and Mrs. T. N. Davis,

Lynchburg, Va., were among the Christmas visitors in Richmond, having come to visit Mrs. Davis' parents.

Dr. R. W. Paul,

Richmond, who has been taking post-graduate work in New York City, returned home for the holidays and later left for Rochester, Minn., where he will take up further work in surgery.

Officers in American Legion at Warrenton.

Dr. Howard Fletcher, Warrenton, has been elected vice-post commander and Dr. W. G. Trow, also of Warrenton, a member of the executive committee of the John D. Sudduth Post, American Legion, for the coming year.

Wise County Active Against Rabies.

As there have been an unusually large number of rabid dogs in Wise County, Virginia, this year, the board of health of that county has decided to end the "mad dog" danger in that county, by not permitting any dog to run at large in the county unless a reputable physician will certify that he has given canine vaccine to the animal. Any dog found running at large shall be killed or confined at the discretion of the county health officer; every rabid dog shall be killed, and every dog suspected of being rabid shall be killed or confined for observation, at the discretion of the health officer.

Dr. and Mrs. Vaden L. McCullers,

Of Locust Dale, Va., were recent visitors in Charlottesville, Va.

Richmond Dental Society.

At the annual meeting of this Society in December, Dr. C. Browne Pearson was elected president and Dr. John C. Tyree, secretary-treasurer, for the coming year.

The Church Hill Medical Society,

Richmond, Va., at their regular meeting in December, elected the following officers for the ensuing year: President, Dr. A. S. Lilly; vice-president, Dr. S. M. Cottrell; secretary-treasurer, Dr. R. S. Faris; librarian, Dr. B. L. Phillips; reporter, Dr. Ramon D. Garcin. Of these officers, Drs. Lilly, Faris and Garcin were re-elected. The Society met at the home of Dr. F. P. Fletcher. After the business session and the reading of a paper by Dr. Marshall L. Boyle on "Malnutrition in Children," supper was served those present.

Dr. William A. Smith,

Haywood, Va., has been named sub-chairman

to have charge of the \$3,000,000 Harding memorial campaign in Madison County, Virginia.

Dr. Carrington Williams,

Richmond, first vice-president of the Civitan Club of this city, has been made president, succeeding Alexander Forward, resigned.

Dr. William T. Green, Jr.,

A member of the class of '20, Medical College of Virginia and recently house surgeon at Bellevue Hospital, New York City, announces opening of his office at 337 New Monroe Building, Norfolk, Va. His practice will be limited to diseases of the ear, nose and throat.

Dr. and Mrs. Powhatan Moncure,

Bealeton, Va., are spending some time visiting a daughter at Chevy Chase, D. C.

The Blue Slip

In this issue of the journal should have your attention, as it means a saving to the Society, of which you are part owner. Look for it and give it your attention, won't you?

The new year starts with this issue of the journal. Let's make it a good one.

Corrected Dates for A. M. A. Meeting.

Since it has been found that the Republican National Convention will not be held in Chicago, the Board of Trustees of the American Medical Association has rearranged the dates for the Chicago meeting, and states that they will be June 9-13, inclusive, instead of in May, as previously announced.

Dr. Gordon Wilson,

Baltimore, Md., at the December 7th meeting of the Baltimore City Medical Society, was elected president of the Society for the ensuing year.

Sir Frederick Treves,

The celebrated English surgeon, died at Lausanne, Switzerland, December 9, at the age of 70 years.

Income Tax Time Again.

All of our readers are now so familiar with the "Who, When, Where, How, and What" of this tax, that all necessary should be the reminder that March 15, 1924, is the last date for filing this return and making at least a first payment. Secure your tax form from collector of internal revenue for district in which you live. You are liable to penalty for failure to make a return within the specified time.

The Annual Report of the Surgeon General of the U. S. Navy

Covers the fiscal year ending June 30, 1923. The various activities of the Medical Department show that the professional work has been of a high standard and the naval hospitals are in excellent condition. At the close of the year, the strength of the medical corps was 757. Health conditions in general were better than the average, compared with figures of the preceding five years. The death rate was the lowest in the history of the Navy.

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Obituary

Dr. Edgar Waples Robertson,

One of the best known and most beloved physicians of the Eastern Shore, died at his home in Onancock, Va., December 11, after an illness of several weeks. He was born in Kingston, Md., October 2, 1845, but had lived in Onancock since a young child. Upon completion of his academic education, he studied medicine at the University of Maryland, from which he graduated in 1866, and at once took up the practice of medicine at Onancock, continuing active in his work until his illness this Fall. Dr. Robertson had endeared himself to the people in that section as only an old-time family physician can do and worked for all that pertained to the progress of his community. He was a member of the Medical Society of Virginia, a fellow of the American Medical Association, and a member and ex-president of the Accomac County Medical Society. In addition to his interest in his profession, Dr. Robertson was an active and enthusiastic member of the Baptist Church.

Surviving him are three sons, one of them being Dr. John W. Robertson, of Onancock.

Dr. Albert Chapman Lancaster,

Of Martinsville, Va., for many years a prominent physician of Henry County, died in a

Roanoke hospital, December 30. He had been suffering for some time from a complication of diseases. Dr. Lancaster was born in Floyd County, Virginia, 48 years ago, and studied medicine at the University of the South, Sewanee, Tenn., from which he graduated in 1900. He practiced in Patrick County, Virginia before moving to Martinsville, and also served in the medical corps of the army in the World War. Dr. Lancaster was a member of the Medical Society of Virginia and a fellow of the American Medical Association. Interment was made in Roanoke. He is survived by a brother.

Dr. Frank Waters Hains,

Formerly of Petersburg, Va., and for many years a member of the Medical Society of Virginia, died in Key West, Fla., December 30, at the age of fifty-nine years. He was on his way to Petersburg from Sebring, Fla., where he had been for his health, when he became ill and was taken to a Key West hospital where he later died. He had suffered for many years with heart trouble. Dr. Haines was a graduate in medicine from the University of Maryland in 1888 and had been a member of the Medical Society of Virginia since 1894.

Dr. George Torian,

Of Brookneal, Va., died December 15, in Lynchburg, death being due to blood poisoning. He was sixty-three years of age. Dr. Torian graduated from the Medical College of Virginia in 1881 and had practiced medicine for many years in Campbell County, Virginia. He is survived by his wife and six children.

Dr. Fielding Lewis Ashton.

News was received December 19 of Dr. Ashton's death in Seattle, Wash., where he had made his home for ten or twelve years and was specializing in urology. Dr. Ashton was a native of King George County, Virginia, and forty-two years of age. He studied medicine at the University College of Medicine, Richmond, from which he graduated in 1905. He is survived by his wife, formerly of Fredericksburg, Va., and two sisters.

Dr. Elijah Brodie Meadows,

Of Oxford, N. C., died December 2, following a long illness. Dr. Meadows was forty-eight years of age and had studied medicine at University College of Medicine, Richmond, from which he graduated in 1901.



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OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Vol. 50, No. 11.
WHOLE No. 860.

RICHMOND, VA., FEBRUARY, 1924

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Original Communications

THE UNDERLYING PRINCIPLES OF SURGERY OF THE INTESTINES AND STOMACH.*

By J. SHELTON HORSLEY, M. D., Richmond, Va.

The underlying principles of most surgical procedures depend upon physiology, and physiology occurs only in living tissue. Surgery of the intestines and the stomach should be based upon physiologic principles, though satisfactory mechanical technic is also essential. It is doubtless better for an operation to be performed bunglingly, if founded upon correct principles, than to have a skillfully executed surgical technic that ignores physiologic principles; but a combination of principles and good technic would be ideal.

The basis for the underlying principles of surgery of the intestines and stomach can be found in recent works on physiology. It is important to emphasize that the books must be recent, for even in the last few years the American and English physiologists, Cannon, Bayliss, Starling, Carlson, Luckhardt, Dragstedt, Alvarez and others have revised many of our former ideas about the function of the stomach and intestines. These new views concerning peristalsis and secretion have an important bearing on surgery of the gastro-intestinal tract.

In surgery of the bowel, after removing or correcting the pathology, efforts should be made to restore function, and there must be a knowledge of the function in order to restore it satisfactorily. Because a certain surgical technic may be successful in the upper intestinal tract, it does not by any means follow that it will be equally useful in the lower ileum or the colon.

The two most important factors in the function of the intestinal tract which affect surgical operation in the upper and in the lower bowel are peristalsis and the bacterial content. Alvarez has called attention to what he

terms the "gradient" theory of peristalsis, and claims that, in general, peristalsis is more rapid in the upper part of the jejunum, and decreases in rapidity down to the cecum. He says the upper part of the small intestine is named jejunum because it is "hungry" or empty, as it quickly transmits its contents to the ileum. The absorption of products from the upper portion of the intestine when obstructed is for some reason very much more serious than the absorption of products of obstruction lower down. Various theories attempt to explain this difference, but the clinical and experimental fact of the rapidity in the fatal course of obstruction in the upper small intestine as compared with obstruction in the lower bowel is accepted by every one. Dragstedt, of the University of Chicago, has shown that if in a dog the upper jejunum is divided and brought into the incision in the abdominal wall, the animal will die from obstruction due to the slight pressure of the margins of the abdominal incision; though if the lower ileum or colon is similarly treated the animal will survive. If a tube is placed in the severed jejunum to prevent the open intestine being compressed by the abdominal wall, the animal does not die from obstruction. He has demonstrated that pressure by a delicate rubber band which would prove fatal in the upper jejunum, would be successfully overcome in the lower ileum or colon. In view of the rapid peristaltic action of the upper small intestine these findings seem paradoxical. The rapid peristalsis, however, seems to have comparatively little force, and a slight obstruction that cannot be overcome quickly deranges the vital mechanism of the upper small intestine.

The clinical deductions to be made from this are, first, that it is exceedingly important in resections of the upper jejunum to provide an ample lumen at the sutured union. In an end-to-end anastomosis, but little diaphragm must be turned in, and if a continuous mattress suture is used the stitches should be merely snugly approximated and not drawn together.

*Read before the fifty-fourth annual meeting of the Medical Society of Virginia, in Roanoke, Va., October 16-19, 1923.

too tightly. A backstitch should be taken at frequent intervals. Preferably only one row of sutures should be used. After the anastomosis is completed the bowel on each side of the union should be invaginated with the finger and thumb to demonstrate whether the lumen at the site of the union is ample. If there is any doubt about this, or particularly if the intestine is dilated from obstruction, an enterostomy should be done. If the anastomotic opening seems too small the suturing must be revised.

In performing an enterostomy anywhere in the small intestine, it is not necessary to use a large tube. The contents are liquid and gas, so a soft rubber catheter, about a No. 14, with one or two additional perforations, is all that is necessary. Elsewhere (*Operative Surgery*, C. V. Mosby Co., St. Louis, 1921, pp. 592-597, and *Clinics and Collected Papers of St. Elizabeth's Hospital*, C. V. Mosby Co., St. Louis, 1922, pp. 227-230), I have described a technic based upon the principle of Coffey, in which an incision is made down to the mucosa of the bowel for a distance of about two inches. The mucosa is perforated at one end of the incision and a catheter is introduced through the perforation and fastened by a pursestring suture, which also transfixes the catheter. The catheter is laid on the exposed mucosa and buried with a continuous suture. The mucosa acts as a valve so that when the enterostomy is to be discontinued the tube can be withdrawn, and usually there is no discharge of fecal matter after the catheter has been removed. In this way but few adhesions are left, rest for the sutured bowel is provided during the period of healing of the anastomosis, and, particularly in the upper part of the intestine, any tendency toward obstruction with its serious consequences is eliminated. In surgery of the large intestine where an accumulation of gas may tend to stretch the sutures, where the bacterial content is high, and healing may be poor, the rest given by this enterostomy aids greatly.

In surgery of the upper jejunum and of the duodenum the intestinal contents have very few bacteria, and extreme precautions for preventing contamination with bowel contents are not essential, though it is always wise to be as careful as possible to prevent infection. The importance of clamping and tying all raw surfaces before opening the lumen of the

bowel, and particularly of closing the triangular area at the mesenteric border of the small intestine, has been fully emphasized in previous communications. In the upper small intestine, however, it is even more important to provide an ample lumen.

In chronic obstruction of the terminal duodenum, caused by a kink or stenosis where the duodenum becomes the jejunum in the transverse mesocolon, the symptoms frequently resemble those of ulcer or particularly of ulcer with stenosis. In such an obstruction, the duodenum is always dilated. The proper regulation of diet can frequently mitigate this condition, and in mild cases may be practically curative. When the obstruction is persistent however, it should be relieved by surgical procedures. As the duodenum is greatly dilated it can be easily anastomosed by the lateral method to the upper jejunum. I have done this procedure five times without mortality, and with complete relief in the majority of instances.

It has been well established by Cannon, Blake and others that lateral anastomosis is unwise if an end-to-end union can be done. A lateral anastomosis frequently leaves blind pockets which may cause trouble later, and the destruction of the function of circular fibers by the incision for a lateral anastomosis is a very serious objection. However, in certain instances, when the lumen of the intestine is small and the mesentery is fat, it is impracticable to do an end-to-end union, and a lateral anastomosis is indicated.

In the lower part of the small intestines, conditions are quite different. The bacterial content increases, and the activity of the peristalsis is diminished. Fatality from obstruction is delayed in this region and, if there is time for the swelling or congestion to subside, a narrow anastomotic lumen is more consistent with recovery than in the upper intestinal tract. One of the main operative considerations here is the avoidance of fecal contamination. In resection of the lower ileum and the colon, it was formerly my practice to use practically the same technic as was employed in the upper small intestine. About six months ago, however, I lost from infection a patient in whom I had done a resection of the lower ileum, cecum and ascending colon for cancer. The technic was carried out by closing all raw surfaces before opening the

bowel, and by severing the bowel from the mesentery outward. The lumen of the bowel was then disinfected as well as possible with moist bichloride sponges. This is the weak part of the technic, when bacterial contents are great as in this region. It is not possible to disinfect the mucosa of the colon and lower ileum by gentle cleaning with bichloride sponges. Stronger antiseptics will of course injure the delicate mucosa. With the bichloride sponging bacterial virulence can be lessened, but not sufficiently to make the procedure

entirely safe. Though I have had a series of ten successful resections of the cecum and ascending colon with this same technic, I cast about for a method of avoiding contamination in such operations.

The problem was quite different from that in the upper small intestine. It is not necessary to establish a wide lumen or to do such accurate suturing, but it is essential to avoid contamination and to provide as far as possible rest for the intestine while healing. The article of Dr. H. H. Kerr, of Washington,

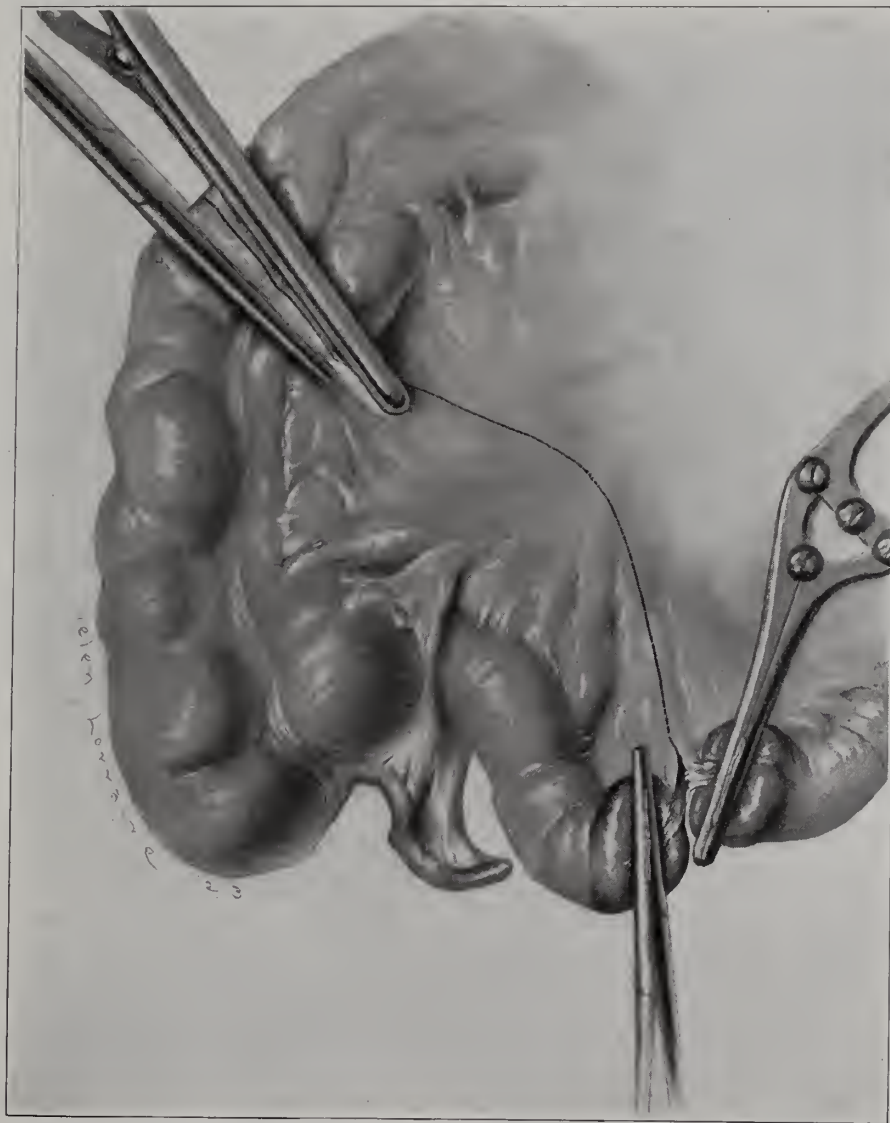


Fig. 1—Drawing shows the resection of the terminal ileum, cecum and part of the ascending colon, according to the technic of Kerr. The black line in the mesentery is point of section. The mesentery along this line should be divided, clamped and tied before the bowel is opened. Note that the clamp on the small bowel is placed at right angles to the mesentery, and on the large bowel parallel to it. The ileum has been divided and cauterized with the electric cautery; the colon is about to be cauterized.

D. C., "Intestinal Surgery," Journal A. M. A., August 25, 1923, pp. 641-647), which was read before the Section on General and Abdominal Surgery of the American Medical Association in June, 1923, seemed to have solved this problem. The technic suggested by Kerr consists essentially of first dividing the mesentery, closing of the raw surfaces, and ligating the blood vessels. Then after packing off the rest of the intestines, the bowel is clamped at the point of proposed resection with two stout clamps placed closely together.

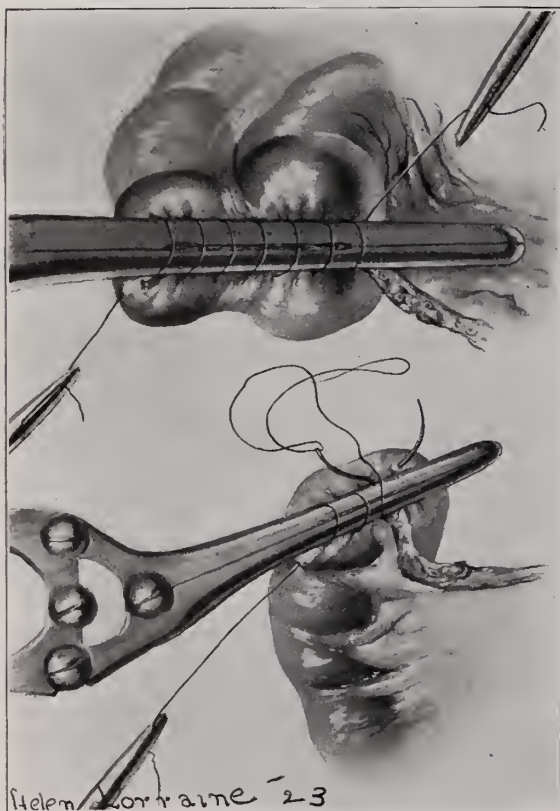


Fig. 2—Both ends of the loop to be resected have been divided, and the basting stitch has been applied on the colon and is being inserted on the ileum. After this is applied the clamps are gradually loosened and removed while the ends of the basting suture are being pulled on in the axis of the blades of the clamp. This automatically inverts the charred stump.

It is divided with the cautery, and the healthy end of the bowel is cauterized down to the clamp as in the clamp and cautery operation for hemorrhoids. Both ends of the loop to be resected are treated in a similar manner (Fig. 1). A basting suture of catgut in a round needle is begun. The first stitch is taken parallel with the axis of the bowel at one side of the clamped bowel. It is then car-

ried over the clamp and a right-angle suture is taken close to the clamp, preferably not entering the lumen of the bowel. This right-angle suture is continued, taking a bite first on one side of the clamp and then on the other. At the end the suture is finished similarly to the way in which it was begun by a bite in the longitudinal axis of the bowel. (Fig. 2). The two ends of this suture, which is a basting stitch, are seized with hemostats and pulled upon as the clamp is gradually released. In this way the charred end of the bowel is automatically infolded. Hemostats grasp the basting stitch close to the bowel. The other end is treated in a similar manner and the two ends of the bowel are brought together while making traction on the ends of the basting stitch. The bowel is sutured

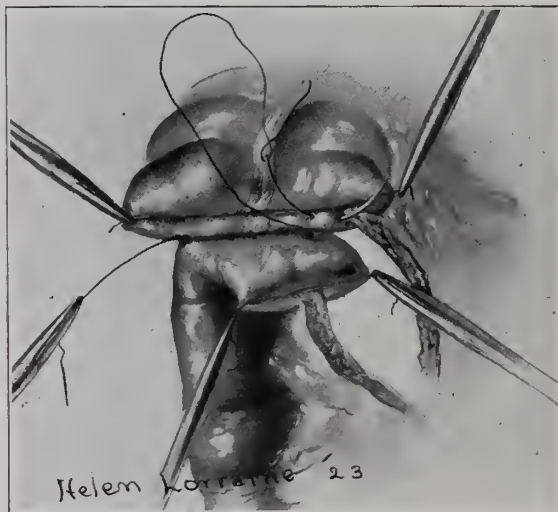


Fig. 3—The ends of the bowel are brought together, keeping traction on the basting stitch. The ileum is fastened to the colon with a continuous suture of linen or silk. This is applied in such a manner as to have a redundancy of about an inch of the ileum in order to produce a slight intussusception and so simulate an ileocecal valve.

bringing the posterior surfaces together with a continuous mattress suture of silk or linen taken close to the basting stitch and using a backstitch at frequent intervals (Fig. 3). The wall of the bowel is snugly approximated, and the suture is terminated by tying it to the end left where the first knot in the suture was tied (Fig. 4). In the large bowel it is well to reinforce this by interrupted mattress sutures of fine tanned catgut. The basting suture is then withdrawn, and the lumen of the bowel is fully established by invaginating the bowel on both sides of the anastomosis with the finger and thumb.

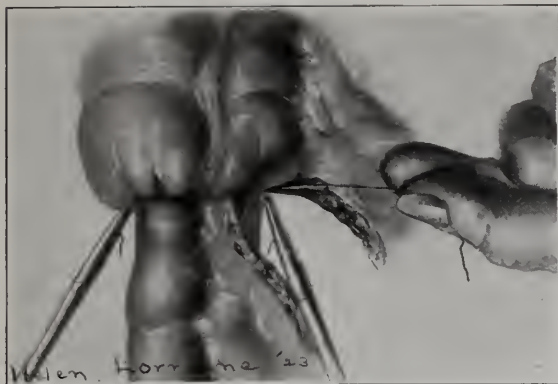


Fig. 4—The suture has been completed, and one basting stitch is being withdrawn, after which the other will be withdrawn. Note that the mesentery of the ileum is not apposed to the mesentery of the colon.

The disadvantage of this operation is that considerable diaphragm is turned in. This would make its use in the upper small intestine, where the bacterial content is low and where the bowel is peculiarly sensitive to even a slight obstruction, rather unwise. In the lower small intestine and in all the colon, however, this objection does not hold, particularly if a catheter enterostomy is done at the time of the resection. Additional advantages are that the diaphragm does not bleed, because it is both crushed by a clamp and sterilized by the cautery, and that no raw surface is left free to absorb the septic material so abundant in the ileum and colon. Methods which involve turning in the raw margin of the bowel of necessity expose to the septic fecal contents this cut surface, which may be capable of immediate absorption of infection. With clamping and cauterization, however, the healing doubtless occurs in the same manner as with the clamp and cautery in a hemorrhoidal operation, the eschar protecting the raw surface until granulations are formed which are competent to resist infection.

There are numerous slight modifications of this technic established by Kerr which would be applicable under varying conditions. For instance, in clamping the resected bowel it is best to place the clamp on one end so that it is not entirely parallel with the mesentery. (Figs. 1 and 4). In this way the mesenteric borders are not approximated, so that the raw surface of the mesentery on one side is apposed by the peritoneum of the bowel on the other. It is well known that it is only necessary to

have peritoneum on one side in order to obtain satisfactory union, but it is essential to have peritoneum on one side. Consequently, when the mesenteric borders are accurately apposed, the lack of peritoneum on either side may delay union.

After the anastomosis has been completed, the mesentery is united with a continuous suture of catgut.

Usually an enterostomy along the lines already mentioned is made in the oral end of the bowel about four or five inches from the anastomosis. By using this technic, contamination is practically prevented, especially if the bowel at the site of the enterostomy has been stripped and then clamped with intestinal forceps. The catheter should first be introduced through a stab wound in the abdominal wall, and its outer end clamped in order to prevent fecal matter flowing through the catheter before the tube has been fixed in position.

Since September 1, 1923, I have done two resections of the large bowel with this technic, one for cancer around the ileocecal valve, in which the terminal ileum, cecum and ascending colon were excised. In the other there was a rather advanced cancer of the transverse colon with enlarged lymph nodes, which were probably mostly inflammatory. However, an extensive resection was done, leaving only the sigmoid and cecum and a small stump of the ascending colon (Fig. 5). Both patients have made a satisfactory recovery, though in the latter case much of the gastro-epiploic artery was excised and this interfered sufficiently with the nutrition of the stomach to cause some gastric symptoms. The patient is now doing well.

In surgery of the stomach I have elsewhere called attention to the underlying principles that should govern operations in this region. No one surgical procedure can be made to fit all conditions that may demand operations on the stomach or duodenum. In extensive infiltrating ulcer of the duodenum the most satisfactory procedure is to occlude the pylorus by the simple method of ligating it with a large kangaroo tendon, and then a posterior gastro-enterostomy should be done. It is probably better not to use clamps in a gastro-enterostomy, and to employ absorbable sutures, though with occlusion of the pylorus, nonabsorbable sutures would doubtless give no trouble. In

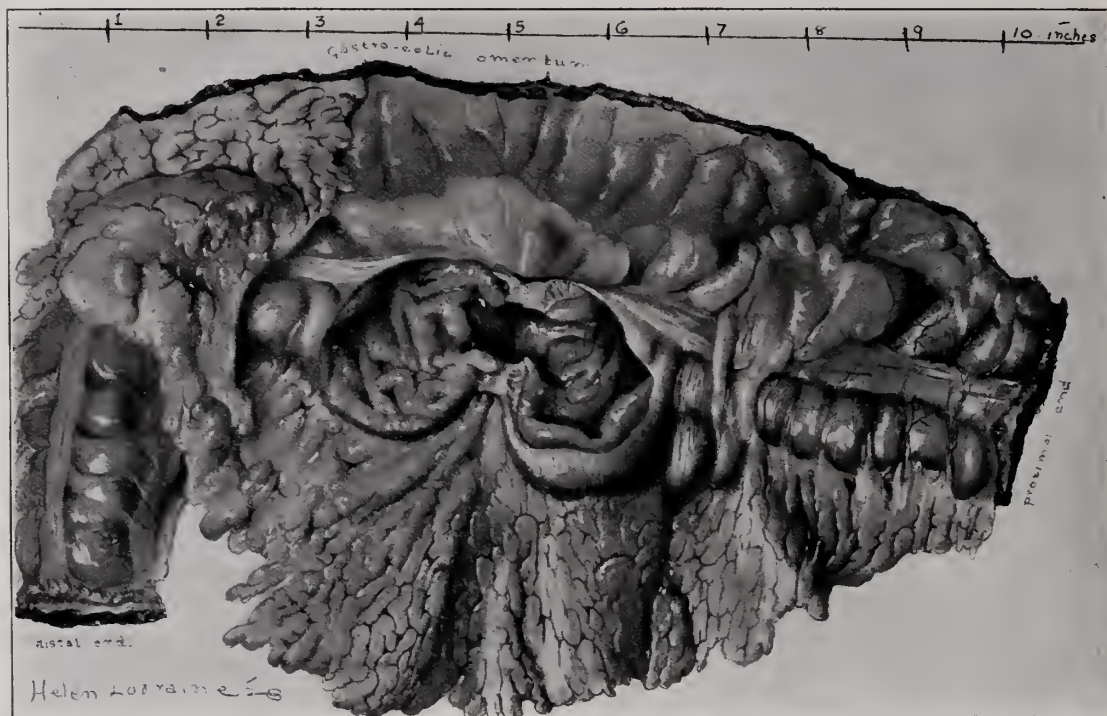


Fig. 5—Drawing of specimen removed according to the technic of Kerr. It consists of most of the ascending colon, the transverse colon, and the descending colon. The specimen is opened from behind. There is a cancer which has produced marked constriction and has everted edges. The specimen contains all of the great omentum and most of the gastrocolic omentum which was removed very close to the stomach. An enterostomy according to the technic described was done in the lower ileum. The patient made a satisfactory recovery.

four cases that I have had, gastro-enterostomy with occlusion of the pylorus was done, following unsuccessful results after pyloroplasty. It seems that occlusion in this simple manner in the presence of adhesions or an ulcer is much more satisfactory than would be such an occlusion performed in normal tissues. It is well known that when a ligature is placed on the normal pyloric end of the normal stomach it eventually cuts through and the lumen is soon re-established. This is the tendency also when there is pathology in this region, but with a large infiltrating ulcer or extensive adhesions the occlusion is more efficient.

When the ulcer is on the stomach side of the pylorus and is large, a resection should be done. If it can be satisfactorily accomplished without too much tension, the Billroth I method, uniting the duodenum to the lesser curvature of the stomach instead of to the greater curvature, is a satisfactory procedure. Where a more extensive operation is necessary, the Polya-Balfour anterior method, joining a loop of jejunum to the stump of the stomach

after a pylorotomy, gives satisfactory results. A small ulcer in the stomach may be resected locally, taking care to excise no more tissue than necessary, and uniting the wound in three layers with absorbable sutures so as to avoid turning in a great amount of tissue. The only inversion of the peritoneum is in the last row of sutures. The first is merely an approximation of the mucosa, the second uniting the incised muscular and peritoneal coat edge-to-edge, and the third row inverting the second row. It is wise to prevent contamination, but if the tissues are well packed off, the spilling of a small amount of gastric contents is not a matter of great concern.

When the ulcer in the duodenum is well circumscribed or if there is a narrow band of constriction or when a gastric ulcer is excised at any point, the pyloroplasty which I have described elsewhere is a very satisfactory procedure. In a paper published in the *Journal of the American Medical Association*, September 15, 1923, I reported the late results of fifty-six such pyloroplasties. There were three deaths following operation, all of which oc-

curred in the first twelve cases, and were due to errors that now can be avoided. In the last forty-four consecutive cases there was satisfactory operative recovery and no subsequent deaths. Of these cases thirty-two are complaint-free, and fourteen were improved. Two could not be traced, though they were complaint-free when last heard from, a few months after operation. Five were unimproved, and were subsequently operated upon again, in one case a pylorotomy being done, and in four a gastro-enterostomy. They are now complaint-free so far as gastric symptoms are concerned. All of the unimproved patients and many of those who are slightly improved were in the earlier series of cases, so that not only has there been no fatality in the last forty-four cases of this series, but there has been a much smaller proportion of unsatisfactory results in the last two-thirds of the series than in the first third.

In conclusion, I wish to emphasize that while it is a fundamental essential to understand the technic of the application of intestinal sutures, it is no less important to view surgery of the gastro-intestinal tract from the standpoint of physiologic function, and to make the operative technic in any particular region conform to these principles.

THE REHABILITATION OF YOUNG WOMEN.*

By TOM A. WILLIAMS, M. B., C. M., Washington, D. C.

As applied to soldiers, rehabilitation is a familiar word. Many look upon it as a novelty of the war and attribute the need for it to army life. Long before the war, however, one of the chief functions of neurologists was the rehabilitation of ill-adjusted persons. The majority of these were women labeled hysterical, so much so, that at one time that disorder was looked upon as exclusively feminine. Mobilization of an army having focused attention upon disadapted men long enough, it seems timely to bring into the limelight once more the fact that the emancipation of women has not absolved them altogether from former weaknesses which, after all, are merely human. It will be instructive, therefore, to consider some kinds of situations in which young women sometimes fail in adaptation and the kind of measures to be adopted for their rehabilitation.

Environmental mal-adjustments show curious expression at times. For instance, it would not be suspected at first that an alimentary disturbance so extreme as the invariable vomiting of food could be attributable to an ethical viewpoint, yet so it frequently is. For nausea is not only an expression of distaste of food but of moral disgust as well.

In one young woman who had been long treated vainly by gastroenterologists, proper psychological exploration showed that she vomited not because food was disgusting in itself but that it reminded her of an episode which made her mouth loathsome. This was having allowed herself in a weak moment to be kissed by a man of evil repute. The uncovering of this incident and its resetting into its proper proportions and relationships caused the association of the incident with the taking of food to cease besides rehabilitating the girl in other respects.

In another patient the mere acquaintance with those of a freer morality than the very narrow one in which she had been brought up led to a disgust of life so great as to lead to hysterical attacks in the office where she worked. In addition to this a severe resentment dominated the girl's relations with others. It took a considerable time to give this patient a proper prospective in these matters and enable her to carry on with any comfort, so deeply rooted were her misconceptions.

In this patient a part was also played by the acute disappointment of a dawning affection unreciprocated by a young man whose alert mind had captivated her slower and more modest intelligence. Very much of a Lothario however, his want of seriousness was quickly found out, to her acute disappointment, even before she had realized under my guidance the depth of her affection.

Situations of this kind, which are very frequent, are among the hardest to adjust in the early stages but, as everyone knows, time works wonders, especially if new impressions of like kind are furnished. When these are lacking the rehabilitation is often tedious.

In one young woman the physical attraction was very intense, although she was fully aware of the unworthiness of its object as a possible husband. The struggle of motives caused great anxiety in a girl already over impressionable to outside opinion, as was shown by a previous laryngeal cramp which prevented her singing

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solos. The love situation not only exhausted her, but the fruit of this was a most obstinate Scrivener's palsy which it took me six months to get rid of. Complications of a physical nature and the method of dealing with the patient were set forth at length in a monograph on "Writer's and other Occupational Cramps" (*Jour. de Neurol. and Psychol.* Leipsic, 1912.) The case itself was also published in *N. Y. Medical Journal* under the title "Multiple Professional Cramp in a Psychasthenic."

In another instance attacks of apparent unconsciousness were traced to a conflict between a love for the family and the desire for freedom of choice where her affections were concerned. In this case physical fatigue was a factor also, and had to be counteracted long after the psychogenetic situation had been dealt with.

DEEPSEATEDNESS OF CAUSES.

Dissatisfactions are often deeply hidden, and are scarcely explicit to the patient until she is led to delve into her own motives in an honest fashion. There is so often a mistaken attempt to conceal from herself what looks like a disloyalty to the family or early traditions, which often conflict with the changed circumstances in which the patient finds herself. The reconciliation can, however, be effected by the patient if she is given to understand the proper philosophy. Very often the traditional ethics has been misconceived in too literal a manner, and the conflict disappears upon a proper analysis. Sometimes, however, there is a real conflict between the true aspiration of the patient and the conservative motives of elders between whom an antagonism has arisen which is irreconcilable without extraneous explanation. It is the duty of the psychiatrist to shed this light on these situations. It is usually more difficult to deal with the friends than the patient herself, when these former are obstructing the patient's proper function. But even that can be done when they are convinced of the wisdom and sincerity of the physician for they are often willing to suspend their own judgments in his favour. The result quickly justifies the psychiatrist, and he has then no more loyal supporters than his former antagonists. A case in point is the following:

Awkwardness and shame, paralyzing initiative in work and society, due to environment repression.—A woman, aged 26, was referred by a physician who had unsuccessfully treated

her several months. She was very reticent, disclosing her complete story with much difficulty and trepidation. She was eating her heart out in routine work in which she was neither using her college education nor satisfying her craving for contact with other human beings. Nor did her leisure afford her the kind of companionship she longed for. She did not know how to reach away from the safe monotony of a sheltered life into the adventurous variety of the constructive idealism which she worshipped. She was immensely handicapped by a lack of ease of manner and charm, which she envied in others: she was ashamed of her awkwardness.

This situation might only too readily have been attributed to the humiliation she felt at the intense and facile stimulability of her physical sexuality, and a prolonged analytic search might have proved too strong a temptation to those psychopathologists who can think only conventionally.

But as insistent as were the physical discomforts of the patient, I considered that the psychological problem was even more important and that to slough this, a change of environment was imperative. It should not need to be said that explanations as to the significance of reproductive physiology were given, and that these were of great comfort to the patient. Although they scarcely affected the phenomena themselves, they altered many of the psychologic consequences. The patient was assisted to take steps to prepare for an occupation which would favor human contact in constructive work, in which she is now, a year and a half later, happily engaged without supervision.

Thus, even when the aspect of the case is highly sexual, and when physical ebullitions are perhaps the most painful of the discordant elements of a scarcely tolerable situation, yet they may not be the main factor of the maladjustment at all, for adjustment may be effected without any success in mitigating these difficulties. The real issue may be a psychosocial one, and affective satisfaction is then (see some neglected *Psychopathic Factors*, J. A., M. A., 1922) gained by the provision of opportunity for the kind of intellectual activity craved.

The contrary was the family attitude in the notorious Bowles case about which I was consulted on one occasion. This girl at thirteen had eloped with a lad not much older but was

arrested before reaching Baltimore. Placed in a House of Detention, she escaped again, only to be reincarcerated swearing that she would never submit to imprisonment, so she jumped from a third story window, breaking both legs. Before the second arrest the father had been advised by me how to proceed, but he obstinately refused to deviate from his oppressive methods, hence the tragic result.

This case may be contrasted with a very similar one where the adopted father was an intelligent physician and himself brought his girl of fifteen and a half to me. The situation was really much more difficult than the former, for the girl was antagonistic at first, and later admitted a sexual impulsion so strong that she would lock herself in her room for days in order to safeguard herself. Here the family cooperated in freeing the patient and helping her through her difficulties, so that in six months she was happily married.

TEMPORARY MODIFICATION OF SURROUNDINGS.

Sometimes the emotive habit is so firmly fixed that a special environment is required for a time to recondition it. As for instance where intense dread of a stormy father paralyzed the initiative of a child whose mother was unduly solicitous, so that, never able to attend school regularly, she eventually took to bed full of hysterical fancies and terrified at a late budding sexuality. After the discovery of the mechanism, which this girl's reticence made very difficult, the special environment was not in this case provided, so that the rehabilitation has not yet taken place in this instance.

However, in another patient it was two years before the essential measure recommended was adopted. This was a young married woman, the victim of intense terror which was traced to a fear of assault which she feared she might really desire. (See *Jour. Abnor. Psy.*, 1911, for full account of the case.) The disclosure of the mechanism produced no improvement in this patient, and she only recovered when the fostering of distrust of herself by an aunt who lived with her, was removed only two years after the reconditioning.

Deformations of character are sometimes very strongly fixed and retraining may be required. This is especially so concerning motor habits which have necessarily to be considerably automatized. In the case of speech for example, stammering is very often traceable to

undue stressing at school or at home in a child whose psychomotor processes are naturally slow, or are retarded in development. The anxiety created by fussy supervision and correction further impedes this smooth co-ordination of the complex speech co-ordination. Once the stammer becomes established, fear of it increases the difficulty. The greater the concentration and determination of the patient, the more likely she is to stammer unless her efforts are directed intelligently which is not often unless she receives some sound information and guidance. The most helpful preliminary to this is a careful analysis of the situation along with a penetrating neurologist.

The same is true of the various tics, the expression of dissatisfaction or uneasiness usually of psychological nature. Space forbids further mention than a reference to an extended presentation in the *J. A. M. A.*, 1922.

However, even though the tic may not in itself be felt as an incumbrance by the patient, yet it is an indication of the need for rehabilitation through an attack upon its sources, of which many of the products may be latent, but are likely to lead to inconvenient mal-adjustments unless dealt with.

PECULIARITIES AS INDICATORS OF NEED FOR HELP.

Eccentricity, mendacity, kleptomania, undue immersion in pleasure, work or religious exercises are all indicators of the need for rehabilitation. The principles underlying these aberrations do not differ from those already indicated. They are only the more striking and dramatic manifestations of states that more often show themselves as timidity, undue reticence, unsociability, lack of enterprise, or in quarrelsomeness, despondency, or a pessimistic view of life. All of these are indicators of need of adjustment to life, which is most quickly, completely and economically effected by the medium of the psychiatrist of sound training and judgment.

For instance, a girl, aged 16, athletic and of exuberant nature, was brought to me by a physician relative who looked upon her as in some way different from other girls. He described her as being unreceptive to the exhortations of her mother as regards behaviour, unequal in her collegiate studies and temperamental in her affiliations.

I found a strongly built girl with active cir-

culatation, exuberant mentality and facile affectivity. She was exceedingly frank but could not quite analyze the particular difficulty she felt the most, viz., an inability to abstract and generalize to the satisfaction of her teacher of literature. Although her memory for detail was very good, she thought she lacked the power to grasp what were looked upon as the essentials by others. She was unable to give an example of this, however, so the issue could not be decided out of hand. But I set forth how very frequently the same literary work may receive very different appraisement at the hands of various critics, and what is significant in literature depends upon the aspect selected. I analyzed a paragraph to illustrate how different persons would vary in their estimation of the various facts contained therein. I prescribed the daily practice of abstracting a historical work, such as Gibbon or Motley, and asked her to send me some examples of the kind of faults to which she felt herself prone.

But there were other difficulties in this girl's life induced by a strong motive to do right and the conflict between a spontaneity of expression which seemed to her harmless and the inculcations of her elders towards repression of this. By nature a tomboy, she was constantly urged to be ladylike, frowned upon and nagged so that she often wept at her own short comings. And yet underneath it all she felt urged to activity which seemed in itself harmless enough. Long strides, running and leaping, expressions of liking for others did not seem so wicked. Worst of all, upon the establishment of menstruation, the idea was implanted that she must be very guarded in her behaviour towards men, who were depicted as lions in the path seeking to devour her. She related this with bated breath, and the effect of such pernicious advice might have been disastrous but for an innate simplicity and beauty of character in the girl.

It was explained to the patient that it was better to grow up into a strong woman through exercise of her body than to vitiate herself by false ideals of ladylikeness, that all people were not constituted alike and that what might be easy for a more indolent nature would be a penance for her. Nor would ingenuousness of behaviour even with men be misunderstood for long. ("To thine own self be true.")

Another of her troubles was that she was told that her desire to serve put her in a posi-

tion of inferiority and yet she had been taught that to serve was christian. Being full of energy and quickly sympathetic, she made a practice of running errands for other girls and even doing some of their work. For this she was scolded on the ground that she was being taken advantage of. I could not disapprove of this provided she did not overburden herself and did not encourage indolence in those she helped.

As in this girl the motives are animated by a high moral standard, and as there is great temperamental energy, repressive methods should not be attempted, but scope for her activities should be provided in the fullest measure. Only in this way will the exuberance be balanced and adapted to the exigencies of contact with others. Unskilful guidance may easily mar a promising life whereas the patient's own aspirations are likely to lead her in beneficent directions.

A psychoneurosis is after all only the expression of want of harmony. In the foregoing instances it has been traceable to active positive factors of hurt. But quite often the factors are negative, i. e., the absence of the proper avenue of self-expression, the circumscribing of the personality by an unsuitable environment such as jail. The home may be a prison. One patient characterized it as a "House of Hate." The vacuity of the patient's mind may be the important factor. Here must not only the way be pointed out but pabulum may have to be provided for the constructive impulses which every healthy human being has.

The rapidity with which rehabilitation can be effected is sometimes astonishing, as for instance, in a girl of twenty-one whose psychological development had become arrested at the twelve year old stage because of complete preoccupation by a series of obsessions, of which the most insistent were those concerning urination, but in which the comparison of the ages of associates was also most intensely preoccupying. These were traced to the impulse to transcend a sense of inferiority which had been imposed upon her by parents whose oversolicitude regarding the child's health had reflected upon her behaviour. It was a striking illustration of care killing the cat. From being a girl unable to concentrate upon the least matter extraneous to her obsessions, she has become able not only to discard these completely, but to show a most remarkable capacity to as-

simulate scholastic instruction, and to adapt herself to external interest. Besides this, distinct change in her physical appearance is occurring, abstracted looks being replaced by an alert mien.

PHYSICAL FACTORS.

So far allusions have been made only to situations where the source is purely psychological, and usually of social, ethical or moral significance. Quite often, however, the source of disadaptation is a physical inadequacy or defect. For instance in a physician's daughter who showed intense timidity besides being deprived of legitimate satisfactions of social life, the sources of the difficulty lay in an undue fatigability since an infection in childhood, an endocrine inadequacy which impaired activity, and an intense acne of the face of which she was much ashamed and which was the cause of much embarrassment, greatly interfering with her social adjustability. Here not only had psychotherapy to be employed, but the improvement of physical condition was an even more important factor in the rehabilitation of this girl, for her good sense had counteracted much of the environmental distresses.

There is no need to insist upon the need for tracing out and getting rid of chronic infections. There is perhaps more need to urge due attention to metabolic and endocrine factors when a young woman finds herself inadequate. But it does not follow that a latent infection, or a faulty metabolism even when present, is the cause of a disadaptation. Many a surgical disappointment would be saved if this were remembered. On the contrary, dissatisfactions are sometimes expressed as visceral perturbations. Always this must be kept in mind in adjudicating a case which superficially looks medical or surgical.

Thus in a case of claustrophobia and agoraphobia, which I have often related, an enlarged thyroid and rapid pulse were present. Some clinicians might have been tempted to treat these latter without exploring the mechanism of the patient's fears, in the hope that these would disappear as thyroid hyperactivity ceased, for we know that hyperthyroidism is itself panic-bringing. In this instance, this would have been to put the cart before the horse, for the fears were traceable to external situations clothed with dread by the imagination of the patient. The method of finding and removing this was discussed in detail in

Chapter VII in my book on "Dreads and Be-setting Fears." (Little, Brown & Co. 1923).

Suffice it to say that in a week the fears were completely removed from a girl who in fear had been unable to enter a meeting place, or cross the street without a circulatory reaction so intense as to cause her to tenaciously believe that her heart was diseased. She has remained well for six years.

Many a gastro-intestinal disorder too should be sought not in the gall-bladder or the appendix but in an anxious mind. The same is true of functional cardiac disturbance. The way to rehabilitate cases of this kind is not through hospitalization, but by a psychotherapy based upon the mechanism of the disturbance.

The peculiarities of the period of gestation are well-known; but the puerperium is also a period of difficulty in many young women. Metabolic and endocrine factors however are not the only ones at work in the troubles subsequent to child bearing and during lactation. Too little attention is paid to the very profound psychological adjustments often necessitated by the marriage state. Economic situation, temperamental differences and a new mode of life may all come to a head during the inactive period following the birth of a child. Hence, a so-called post-puerperal psychosis may merely be the expression of maladjustment and require a psychological exploration which may provide the stepping stone to setting the patient upon her moral feet once more. For example, in a patient sent from Norfolk eighteen months ago, it was attention to this factor which led to the rehabilitation.

In another particularly complex case in a patient sent from West Virginia last summer, only by sedulous attention to her psychology was suicide prevented and recovery effected.

These contentions, so true, have unfortunately often been misapplied even by skillful physicians and surgeons. And therapeutics based upon them has been attempted *without adequate exploration* to ascertain whether the patient's affection is psychogenetic or not. We should think poorly of the gynecologist who suspended the uterus because of a pain in the back unless he had both incriminated the uterus and excluded bones, joints and nervous system as factors. Very inadequate would be the diagnosis of a neurologist who gave arsphenamin to an ataxic patient unless he both ex-

cluded polyneuritis, pernicious anemia and spinal tumor, as well as found definite signs of syphilis.

And yet much of the psychotherapy attempted is based upon a diagnosis of the situation even less adequate than the foregoing. This is exactly what the charlatans do who are at present riding to wealth on the wave of interest in applied psychology.

So that correct psycho-diagnosis is an essential preliminary to all efforts at rehabilitation, and long and intelligent training is required by those who may hope to succeed in the task.

1746 K Street.

DISCUSSION

DR. L. G. PEDIGO, Roanoke: Dr. Williams has been a guest at intervals and we feel that we can take personal liberties in discussing his papers. We can hold up his papers as models for facts. Considering that the author of this paper was born of Scotch and Welsh parents and located in Washington, his treatment of a difficult subject is very edifying. These cases are so difficult that the average practitioner finds great difficulty in dealing with them at all and, if we could unload all our cases of this sort on a man like Dr. Williams, it would be a great comfort. The trouble with this type of case is the lack of the faculty of decision—there is indecision of some kind. It is difficult to bring them to decision on any subject at all. Another feature, and it is a suggestion in regard to the treatment—get the cases away from the family. Of course the family is not always at fault, but the patient thinks so. Her mental attitude is such that the morbid environment must be gotten away from. She impresses upon the new candidate for her affections that there is a diabolical conspiracy against her.

DR. WILLIAMS, (closing): I am very proud to say to Dr. Pedigo that I am not a stranger and you may say anything you like; also, I am a member of the Medical Society of Virginia. Washington is Virginia after all, and a great many patients come to me from Virginia physicians.

About indecision—indecision is usually due to want of understanding on the patient's part. Not knowing her own psychology, she feels that such and such is right. Understanding, for the most part, is being capable of proper judgment. Sometimes, when a patient does not develop the habit of decision, although understanding herself, it is necessary to have training just as in school. One patient now being trained by the wife of a clergyman had been kept childish by her parents during her whole life and, although of good mind, had to be trained just as a child.

A woman from South Carolina, whom I observed, required three months' training in canteen work before she acquired the power of decision. After her training, she managed a canteen in South Carolina, showing great decision of character, after practicing the ideas of her own psychology which she had gained. I think that only when the family influence is very bad should the patient be removed from home, or if you cannot show the family their mistakes and help them overcome the bad influences. As a matter of fact, if you do change the environment, do not put the patient in a general hospital; that's all right physically, but she will do better in some

place more like the normal. Only when the personnel is trained for it can harm fail to accrue to neurotics in hospitals. (See "Management of Psychoneurotics in General Hospitals," *Southern Medical Journal*, 1921).

THE SCOPE AND LIMITATIONS OF SUBTEMPORAL DECOMPRESSION IN ACUTE BRAIN INJURIES.*

By J. G. LYERLY, M. D., Richmond, Va.

The studies in this paper are based on a series of ninety-six cases of acute head injuries with unconsciousness, or signs of intracranial injury, who were admitted to the service of Dr. C. C. Coleman of the Hospital Division of the Medical College of Virginia, over a period of one year, from July 1, 1922, to July 1, 1923. This does not include the cases that were seen in other hospitals or in consultation which, if included in this series, would increase the number considerably. Of these cases there were thirteen deaths, making a mortality of 13.5 per cent. This includes all of the fatal cases, some of which died within several hours after admission.

There were forty-one cases which had fractures of the skull, thirty-two of which were compound, eight depressed, and five of the latter were compound as well as depressed. All of the cases of depressed fractures were operated upon to remove the depressed fragments from the brain for local pressure. This does not mean that they had a subtemporal decompression which is done to relieve general intracranial pressure. It may become necessary later to do a subtemporal decompression in these cases if the intracranial pressure becomes excessive.

Of the thirteen cases that died, eleven had fractures, and two showed no fracture of the skull. In these two cases that showed no fracture, one was proved by autopsy, and in the other no autopsy could be obtained, but the X-ray, together with an extensive laceration of the scalp exposing the skull, did not reveal a fracture, although the spinal fluid was very bloody and under increased pressure at spinal puncture. This indicates that it is not necessary for a patient to have a fracture of the skull in order to receive a fatal intracranial injury.

As to the cause of these injuries, there were

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thirty-three injured by automobiles, twenty-eight by falls, and the others by miscellaneous causes, showing the predominance of the automobile as an etiological factor.

There were forty-six cases with lacerations of the scalp. Regardless of whether or not the patient has a fracture underneath the laceration, it is our practice always to excise these lacerations under local anaesthesia within the first twelve or sixteen hours, or as soon after shock as possible, in order to convert a potentially infected wound into a clean incised wound. For compound depressed fractures or gun-shot wounds of the brain, we follow the plan of Cushing in his war experience of debridement of the scalp and removal of contaminated bone, with irrigation of the wound in the brain with normal saline solution to free it of blood clots and other foreign material.

In this series there were nine subtemporal decompressions with four deaths. Two of the deaths were due to meningitis as proved by autopsy, the source of the infection in one case apparently coming from a fracture into the sphenoid sinus, and in the other from a fracture through the middle ear with rupture of the ear drum on the same side. The third and fourth deaths occurred in patients who developed pneumonia, as proved by autopsy in one case, and clinically in the other.

As the brain is the most important structure involved in a severe head injury, it and its surrounding membranes and fluid will be given the most consideration. Unless there is some depression of fragments causing pressure on the brain or a compound fracture of the vault, fractures of the skull will be given the same importance as laceration of the scalp, bleeding from the ear or nose, ecchymosis around the eyes, or ecchymosis around the mastoid. These are all evidences of a possible injury to a more vital structure within the cranium. Other signs than the above must be looked for, because they do not reveal to us the damage done to the brain, and any of the above signs may be present without evidence of brain pathology.

Intracranial pressure is undoubtedly the most important effect of the average brain injury. It may be due to edema of the brain, intracranial hemorrhage, increased secretion of the cerebro-spinal fluid, transudation of serum from the traumatized tissues into the fluid spaces, or the lack of absorption of the cerebro-

spinal fluid.

The most logical way of classifying these cases from the therapeutic standpoint would be: (1) Those which do not have intracranial pressure; and (2) those which do have intracranial pressure. Under the class of cases which do have intracranial pressure it may be due to: (a) edema of the brain; (b) hemorrhage; (c) edema plus hemorrhage; (d) meningeal hemorrhage; (e) infections, meaning meningitis, encephalitis, or abscess; and (f) localized pressure as in depressed fractures.

When a patient is admitted to the hospital in an unconscious condition, or with a history of transient unconsciousness, every effort should be made to determine whether or not he has a dangerous pressure. The signs upon which we rely chiefly to determine this are: drowsiness or unconsciousness, pulse rate, systolic and diastolic blood pressures, eye-ground findings, and spinal fluid pressure measured with a manometer at spinal puncture; and of less importance signs such as vomiting, condition of the pupils, X-ray examinations, focal signs, temperature, convulsions, and respiration. If there is a rapid increase in the intracranial pressure, as from hemorrhage, during the first three to twelve hours, there will be first a slowing of the pulse rate and a rise in the systolic and pulse blood pressures. Later, if the pressure is not relieved, a rise in the pulse rate and a fall in the systolic with a high pulse pressure will result from a fatal pressure transmitted to the medulla. If the life of the patient is to be saved, before the pulse rate begins to rise or the systolic blood pressure drops, quick and efficient measures will have to be instituted to relieve the pressure, employing a subtemporal exposure to evacuate the clot and stop the bleeding, as in meningeal hemorrhage. It would be useless to temporize with a spinal puncture to relieve the pressure in such a case. Should the pressure come on more slowly over a period of days, as from cerebral edema, we have not found any great rise in the systolic blood pressure, but there does seem to occur a rise in the pulse pressure and a slowing of the pulse rate. Here haste in radical measures to relieve the intracranial pressure may not be necessary, and resort to more moderate procedures is advisable. There may be given a thirty per cent solution of sodium chloride in one to two ounce doses every three hours, or a saturated solution of

magnesium sulphate given in half ounce quantities every three hours, as advised by Dowman, with daily spinal punctures to estimate the spinal fluid pressure with the manometer and to reduce the pressure by withdrawal of the fluid as advised by Jackson and others.

Some brief reports are given herewith as an illustration of acute brain injuries, some of which may or may not be aided by a subtemporal decompression.

The following case illustrates the great benefit that may be derived from spinal punctures alone, in a case of rather severe intracranial injury with subarachnoid hemorrhage and pressure:

Case 40, J. H., white, male, age 60 years, admitted on March 12, 1923, with history of being knocked down by an automobile. Was unconscious and had hematoma in right posterior parietal region. Had ecchymosis around right eye, vomiting, and had bleeding from nose. Reflexes were normal, and had no paralysis. Pupils were equal and reacted to light. Eye-grounds showed engorgement of retinal veins. Pulse 72, blood pressure systolic 180, diastolic 90. Spinal fluid very bloody, pressure 30 mm. hg. Battle's sign developed behind both ears. X-ray did not show a fracture. Patient was very restless and semi-conscious for a week. General condition was very poor with serious chest injuries and associated complications. Intracranial pressure was relieved by repeated spinal punctures and hypertonic fluids by mouth. Patient made an excellent recovery.

This patient's general condition was not good. The intracranial pressure was readily controlled by repeated withdrawal of the bloody subarachnoid fluid. Free blood in the subarachnoid spaces can be removed most easily by lumbar drainage, and it alone should not be an indication for a subtemporal decompression, because all of the free blood is not removed in this way.

We have never seen any danger result from spinal punctures in the early stages of acute brain injuries even when the intracranial pressure was high. A careful eye-ground examination is always made before every spinal puncture, to rule out a choked disc which, in our opinion, should exclude a spinal puncture in any case because of the well known fatal tendencies of a spinal puncture in a brain

tumor with choked disc. We have never seen a choked disc in acute brain injury even when the spinal fluid pressure was high as registered by the manometer.

The following case is an example of almost immediate relief of symptoms following a subtemporal decompression:

Case 9, J. C., white, male, age 64 years, admitted November 9, 1922, with history of falling from wagon. Was temporarily unconscious. Examination showed contusion of scalp in left parietal region. Battle's sign was marked behind left ear. Was conscious and rational, but had marked aphasia. He could understand what was said and could write his name very well, but could not name objects nor say what he wanted to say. No paralysis was present except for little weakness in right lower face. Pupils were equal and normal. Eye-grounds showed engorgement of retinal veins and hyperemia of left disc. Reflexes did not show anything abnormal except for a few beats of ankle clonus on right side. Pulse was 56, and blood pressure was systolic 140, diastolic 78. X-ray showed fracture of skull starting in left parietal region running down into base of left middle fossa. Under local anesthesia a left subtemporal decompression was done. The dura was very tight and, upon nicking same, a stream of bloody fluid escaped under high pressure. The brain was found to be contused and plum colored. On the following day the aphasia was improved. The patient was discharged three weeks later without headache or any signs of aphasia.

Attention has been called to the fact by Naffziger that in a certain proportion of cases there seems to be imprisoned a large collection of fluid in the subdural space and, when the dura is nicked at subtemporal decompression, the fluid spurts under great pressure. This fluid which is between the dura and arachnoid cannot be removed by spinal puncture, which only drains the subarachnoid space. A subtemporal decompression here gives a prompt and satisfactory relief of symptoms.

The following case is an example of a rather severe brain injury with increased intracranial pressure, in which a subtemporal decompression does not prevent a fatal issue:

Case 5, W. B., colored, male, age 50 years, admitted on July 8, 1922, with history of being knocked down by an automobile and rendered unconscious. Since then has been in a stupor

and extremely restless, scarcely ever using right arm or leg. Pupils were equal and sluggish. Right biceps and knee jerks greater than left. Umbilicals absent on right. Positive Oppenheim and Gordon on right. Pulse 64, and blood pressure systolic 124, diastolic 85. X-ray showed a fine linear crack in the frontal bone. Eye-grounds were negative except for fullness of veins. Spinal puncture showed extremely bloody fluid, hemoglobin estimation on fluid fifty per cent, pressure 18 mm. hg. Under local anaesthesia a left subtemporal decompression was done finding subdural hemorrhage and contusion and laceration of brain on left side. The brain was under high pressure, was very dry, and no fluid was present in the subarachnoid spaces. On the following day spinal puncture showed pressure of 16 mm. hg., and fluid less bloody. Blood pressure systolic 134, diastolic 88, pulse 70, extremely restless. Temperature, pulse, and respirations gradually went up and patient died of pneumonia on sixth day. Autopsy revealed fracture of the skull, laceration and contusion of the brain, subdural hemorrhage, and hypostatic pneumonia.

It cannot always be predicted as to whether or not a subtemporal decompression will adequately offset the pressure. There seems to be a class of cases in which the brain is under tremendous pressure and, when it is exposed by a subtemporal decompression, it is found to herniate rapidly upon opening the dura, and to be extremely dry and without any free subdural fluid. When this condition exists, the subarachnoid spaces over the cerebral cortex are probably obliterated and the cerebrospinal fluid cannot be absorbed. Then it is necessary, along with a subtemporal decompression, to resort to spinal drainage to remove the dammed up fluid in the basal cisterna and ventricular system. Dr. C. C. Coleman is of the opinion that unless a subtemporal decompression removes something, whether it be free fluid, blood clot, or some other foreign substance, it generally fails to relieve the pressure.

The following case is another example of great benefit derived from a subtemporal decompression:

Case 79, E. F., white, male, admitted on August 4, 1922, with history of a fall by which he was rendered unconscious. Had a laceration in the occipital region, which was excised under local anaesthesia and the wound sutured. Had bleeding from left ear, and eye-grounds

showed retinal veins engorged. X-ray was not conclusive of fracture. Pulse was 52, blood pressure systolic 136, diastolic 84, on admission. Three hours later blood pressure systolic 122, diastolic 62, pulse 60. Four hours later blood pressure systolic 114, diastolic 60, pulse 56. Thirteen hours later blood pressure systolic 128, diastolic 28, pulse 60. Twenty-one hours later blood pressure systolic 114, diastolic 20, pulse 56. Spinal puncture showed bloody fluid under pressure of 30 mm. hg. Under local anaesthesia a right subtemporal decompression was done. Upon opening the dura a large amount of free fluid escaped under great pressure. The brain was contused and edematous. The patient made a rapid recovery and was discharged from the hospital in two and a half weeks.

This case also indicates the wonderful improvements following a subtemporal decompression upon finding a large amount of subdural fluid and a wet edematous brain. It also exhibits beautifully the falling diastolic and rising pulse pressures with a slowing of the pulse rate in a progressive rise in the intracranial pressure from cerebral edema and subarachnoid bleeding. We do not believe that spinal punctures here alone would be sufficient to take care of the intracranial pressure which probably would continue for several months following such an injury.

The following case shows how hopeless some patients are from the first, usually dying within several hours after admission, regardless of what is done for them:

Case 93, J. F., white, male, age 11 years, admitted on April 30, 1923, with history of falling four stories from a building. Was unconscious and had extensor rigidity of neck, back, arms and legs, resembling decerebrate rigidity. This was more marked on the right side. Pupils were dilated and equal and did not react to light. There was an inexhaustible ankle clonus on the right side, and exhaustible on left. Had double Babinski. Vomited some blood. At 7:30 P. M. pulse was 100, blood pressure systolic 122, diastolic 78. One hour later, pulse was 90, blood pressure systolic 144, diastolic 76, temperature 101.4. Two hours later pulse was 112, blood pressure systolic 130, diastolic 46, temperature 104. At 11:30 P. M., four hours later, pulse was 160, blood pressure systolic 120, diastolic 20, temperature 107.4. Patient died eight hours after admis-

sion. X-ray showed fracture of first cervical vertebra.

This patient had a direct injury to the medulla. The rapid rise in temperature, the pulse, and blood pressure findings were especially of interest. The systolic blood pressure remained up until the end, while the diastolic pressure was falling, giving a progressive rise in the pulse pressure, accompanied by an increase in the pulse rate and a hyperthermia, which meant disturbance of the medullary centers.

There does not appear in this series a typical case of extradural hemorrhage, such as we very much look for but rarely ever see. There does appear a case of extradural hemorrhage with which was associated grave injuries to the intracranial structures but to which death could not be attributed alone.

Case 7, R. H., colored, male, age 25 years, admitted February 2, 1923, with history of having fallen a considerable distance. Entered hospital deeply unconscious and in shock, with bleeding from nose and left ear. Few hours later, right pupil was larger than left and did not respond to light. Had double Babinski and vomited. Had laceration of scalp over right parietal region. Pulse was 60, and blood pressure systolic 130, diastolic 90. Two hours later pulse was 70, blood pressure systolic 144, diastolic 32. With diagnosis of probable extradural hemorrhage, it was decided to operate at once, but the patient died of respiratory failure before the operation could be done. Autopsy revealed fractures of the skull radiating into all three fossae on both sides of the skull, with part of the rim of the foramen magnum split off and depressed, extradural hemorrhage one inch thick on right side, and thick layer of subdural hemorrhage all over the surface of the brain and around the medulla.

There is probably no other condition which the surgeon must recognize and meet more promptly than a case of extradural hemorrhage. The history of a relatively mild head injury, with or without temporary unconsciousness, followed by the so-called "lucid interval" of consciousness, and then followed by unconsciousness, should always put us on our guard against extradural hemorrhage. The condition must be recognized early, relying on the patient's history and condition before he be-

comes unconscious, also the unequal pupils, the slow pulse, and the high systolic and pulse pressures. When it is recognized, a prompt operation must be done through the subtemporal route, with removal of the blood clot and ligation of the bleeding vessel, even before the systolic blood pressure falls or the pulse rate increases, if the life of the patient is to be saved.

503 Professional Building.

DISCUSSION.

DR. JULIAN RAWLS, Norfolk: I would like to call your attention to some apparently very severe brain injuries which have entirely cleared up on only symptomatic treatment. Of course there are times when an operation is an absolute necessity either to save life or to prevent bad sequelae.

Recently we had six cases in a period of three months, all of which were treated symptomatically, all of which recovered and, up to date, none of which have developed bad symptoms.

One of these patients was a negro man brought in the hospital by the patrol. He had a bullet wound between his eyes from which brain tissue was oozing. The next morning he had some little disturbance in mentality, he answered questions rather slowly, but that was about all. An X-ray showed the bullet to be in the mid-line about one-half an inch from the occipital bone. It had missed both his optic nerve and his longitudinal sinus. He stayed in the hospital for two weeks with no rise of temperature and practically no mental disturbance. I saw him two months after leaving the hospital, when he appeared to be perfectly normal in every way. No attempt was made to remove the bullet.

Another case was a child who fell from a second story window and landed on her head on a concrete pavement. She had a fracture completely across the vault with a fluctuation all over her head. She probably did her own decompression beneath her scalp. Within a week her symptoms had entirely disappeared and she left the hospital.

In another case a child was brought in who had been run over by an automobile. She had two convulsions in the ambulance coming in. She was in coma all night, but by morning her symptoms began to clear up and in a few days she was all straight. This child had a discharge of serum from her ear.

In another case, a young school teacher was run over by an automobile. She had both a fracture of the base and a fracture of one lamina of the third cervical vertebra. She developed a facial paralysis and was unconscious for three weeks. Under expectant treatment her paralysis has cleared up, her physical symptoms have disappeared and her mental condition, except for a slight instability, is normal. She was injured in April and she expects to resume her school teaching in February.

Now don't misunderstand me. I do not believe in sitting by and letting a patient drift on until a falling blood pressure and a rising pulse rate indicate that we have waited too late to save his life or until we doom him to a life of mental instability or possibly epilepsy, but I do believe that a good many cases of severe brain injury are best treated expectantly.

SOME POINTS IN THE DIAGNOSIS OF EXTRA-UTERINE PREGNANCY.*

By W. DENNIS KENDIG, M. D., Kenbridge, Virginia.

Our whole knowledge of a proper conception of the subject of extra-uterine pregnancy dates back since 1863 when Lawson Tait operated his first case. Since that time much advance has been made with the diagnosis and treatment of this condition, yet within the last few years very little that is new has developed. However, because mistakes in diagnosis seem to be relatively more frequent than would be expected, because it is a condition of frequent occurrence, and because early operative measures are of such great importance, this paper would seem to be justified. My attention was called to this difficulty in diagnosis from the fact that our records show that less than 50% of cases of extra-uterine pregnancy admitted to the hospital were diagnosed before admittance.

Brady, in the *Johns Hopkins Hospital Bulletin* last May, states that in a series of fifty cases from 1917 to 1922, their diagnosis, after admittance to the Hospital was correct in 72% of all cases taken together, 75% in tubal abortion and rupture, and 60% in unruptured cases. At first glance, extra-uterine pregnancy may not seem to be so frequent, yet Fancher states that it is estimated that about 1% of all pregnancies are extra-uterine. The necessity of early operation is well stated by Montgomery of Philadelphia, who "believes it better to operate at once even though the patient may be profoundly shocked, and then employ measures for restoring circulation as the operation proceeds." De Lee quotes Schauta as saying that in 241 cases of extra-uterine pregnancies treated expectantly, he found 75 recoveries and 166 deaths.

Pathologically, extra-uterine pregnancy is divided into ovarian, tubal and abdominal pregnancy. This condition is also divided into three definite stages, exhibiting different symptoms and presenting different problems to the physician, viz: Before rupture, after the time of rupture, and those cases which survive rupture without operation. Yet, on account of the fact that a majority of the cases mark this stage, on account of the necessity for an early recognition of such cases and on account

of the demand for prompt operative interference in the ruptured stage, I shall confine my remarks to the discussion of this, the tragic stage of extra-uterine pregnancy. Nearly all cases of extra-uterine pregnancy rupture before the twelfth week. Polak found that 299 cases out of 307 reported ruptured before this time. A ruptured extra-uterine pregnancy is seen usually first by the general practitioner. The recognition of the condition, except in the text book cases, requires a careful history, a thorough physical and laboratory examination, and even then a large percentage of cases are not recognized until a laparotomy is performed.

It is considered that the history is of first importance in the diagnosis of extra-uterine pregnancy. Change in menstruation constitutes the most important point in the history. You will find a missed or irregular period and, if the period is present, the quantity is small. Usually the patient has given birth previously, followed by a long period of sterility, and then has a delayed, missed, or irregular menstruation. Absolute sterility is not definitely associated with ectopic pregnancy, but relative sterility, especially the one child type, is a very significant point. A history of previous pelvic disease, such as congenital anomaly, inflammation of the tube, intra-uterine instrumentation, intra-abdominal operation, especially some procedure for the cure of sterility, are of great importance, but a lack of such history should not influence a diagnosis against it.

Although it cannot be proven definitely and although I know of no authority supporting it, I am of the opinion, from the history of our cases, that many extra-uterine pregnancies are caused by the use of contraceptive measures. I mean that contraceptive measures are used during the first ten days after menstruation, and not used for the ten days or two weeks previous to the period. This violation of the physiologic laws of copulation, I believe, would render the lining mucous membrane of the uterus less receptive to normal gestation, and inhibit the usual activity of the cilia, occasionally causing the impregnated ovum to take the wrong course or remain stationary in the tube.

Pain is the chief and most constant symptom. It is sudden, intense and of a cramp-like or colicky character, usually localized in the lower abdomen to one side, although at times the pain may be higher up in the region of the

*Read by title at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

gall-bladder. In extra-peritoneal rupture, the pain varies according to the amount of blood lost. At times when the pain strikes a patient the shock is so profound that there is a complete collapse, so much so that patients have been known to fall on the street. A decidua is expelled upon the death of the ovum after rupture. The decidua is expelled in piece meal or in a whole decidual mass or cast, with the characteristic bloody discharge that does not readily clot. This is also one of the chief diagnostic points. The pulse is small, frequent or hardly palpable, its degree depending upon the amount of blood lost and upon the extent of shock. There is a decided drop in blood pressure, the patient becomes anemic, the red blood count comes down, a leukocytosis develops, the hemoglobin index falls, there is mental disturbance, inability to arise and assume the erect posture, the patient is pale, has fainting spells, dyspnea and cold sweats. There is usually subnormal temperature early during shock and later a slight temperature elevation. The lower part of the abdomen is rigid and very sensitive to palpation. We may find the cervix is sensitive to motion, pain upon defecation, lower abdominal dullness on percussion, the usual breast phenomena and other symptoms common to early pregnancy.

The above picture should lead to a careful investigation. Upon pelvic examination the parts are found blue, congested, and the uterus, due to the absence of the growing ovum, is not much changed in consistency or shape, although it is enlarged and there is usually a slight softening of the cervix. There is great pain on movement of the cervix, due to the peritoneal irritation, caused by the blood which gravitates into the cul-de-sac. A vaginal examination will sometimes reveal a soft boggy enlargement or blood crepitus in the abdomen, or a hematoma in the fold of the broad ligament.

Cullen pointed out that the dark color of the umbilicus is at times a sign of ectopic pregnancy. Since that time Novak says that several writers have noted this sign, and found it of great help in making a diagnosis. Dr. Jackson has made a suggestion for the determination of Cullen's sign when it is apparently absent, that of placing the patient in a dark room, and throwing the light of an ordinary flash light on the umbilicus, which he claims will bring out the greenish blue color.

Schuman describes another class of symp-

toms, which he calls the stenic variety, and is concurred in by Cresler and others, who call them silent cases of extra-uterine pregnancy. Here we do not have collapse, pallor, weak pulse or other signs of hemorrhage: but the diagnosis has to be determined on the history, tenderness, distention of abdomen, especially on bimanual examination.

It must not be forgotten that tubal pregnancy may be double, recurrent or bilateral. A tubal pregnancy may co-exist with a uterine pregnancy. Of these Heineck says that the recurrent type is by far the most frequent, and that the recurrence is nearly always in the opposite tube.

Dr. Stuart McGuire, in a paper before the Southern Medical Association a few years ago, states that in a series of fifty cases there were six who had a recurrence in the opposite tube and were operated on by him the second time. He estimates that there were six other recurrences, who went elsewhere for treatment.

Shock with abdominal symptoms, in a woman capable of bearing children, should always create a suspicion of ectopic pregnancy. As soon as a diagnosis is made, the treatment is invariably surgical. The operation should be performed with as little anesthetic as possible. Always withhold stimulation until the bleeding points are tied off.

I would like to emphasize the following points:

1. Where there is any possibility of an extra-uterine pregnancy, obtain an accurate and complete history of the case.
2. There is usually a subnormal or no temperature during shock of the tragic stage, although temperature will develop later.
3. Discharge of the decidua without villi is a pathognomonic diagnostic point.
4. Never give stimulants until after ligature is secure around the bleeding points.
5. Extra-uterine pregnancy is more frequent than is generally believed.
6. Extra-uterine pregnancy is more probable, it appears, in women who for a week or so after menstruation, and for this period only, use contraceptive measures to prevent conception.
7. Immediate operation as soon as diagnosis is made. These cases usually recover if operated on early. These cases are usually fatal if left to nature.

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TUBERCULOUS AND NON-TUBERCULOUS COMPLICATIONS AT PINE CAMP SANATORIUM DURING THE YEAR 1922.*

By W. NELSON MERCER, M. D., Richmond, Va.
Director, Tuberculosis Division, Richmond Health Bureau.

The correct evaluation of statistics lies in a thorough understanding of the conditions pertaining to the subject under consideration. Therefore, I will describe briefly the sources and the types of patients admitted to and under treatment in Pine Camp Sanatorium of Richmond, Va., during the year 1922.

Pine Camp Sanatorium is the municipal tuberculosis hospital operated by the Department of Public Welfare of Richmond for resident white tuberculous patients who are unable to afford the expense of sanatorium treatment in other institutions. However, Richmonders who have been to various sanatoria and are unable to further pay their way in them are frequently admitted to Pine Camp, if proven to be worthy cases still in need of hospitalization.

The chief sources of admission are (1) from the free City Tuberculosis Clinic, (2) from consultations by the Director of the Tuberculous Division with practitioners in the city, and (3) by direct applications of tuberculous patients who reside in the city or for the time are under treatment in other sanatoria. No discrimination is made regarding the clinical classification of applicants, provided they are eligible socially and financially and are in need of sanatorium treatment. Due to this fact the percentage of far advanced cases admitted to Pine Camp is higher than prevails in other Virginia sanatoria, which fact should be remembered when comparing the tables of complications.

With a capacity of thirty-six, ninety-two patients were treated at Pine Camp during the year 1922, their stay ranging from two days to twelve months and, although this number is comparatively small, we may derive some-

*Read at fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

thing of benefit from the results obtained.

Upon comparison of the three tables, it is evident that the vast majority of deaths occurred among those patients who had tuberculous complications of an extreme nature. Six of the total of twelve fatal cases had laryngeal involvement in an advanced stage. Most of the laryngeal cases were admitted with this complication and had advanced pulmonary tuberculosis as well. Some came to Pine Camp as a last resort—in extremis.

An entirely different picture is presented by the non-tuberculous complications, the only death among these being due to a post-operative carcinoma of the stomach, resulting in inanition.

It will be noticed that the proportion of improvement is greater among the tuberculous than among the non-tuberculous complications, which may be accounted for by their yielding more readily to treatment, if this is begun when they first appear. Ten of the twenty-six tuberculous complications which improved were benefited by surgical intervention. Five of the eleven non-tuberculous complications which improved were likewise helped by prompt surgical treatment.

Those complications which remained unimproved yielded to no treatment whatever, although they were not progressive in every instance but were chronic in character.

TABLE No. 1.
PINE CAMP SANATORIUM.
Tuberculous Complications, 1922.

Complication	Total	Improved	Unimproved	Died
Tuberculosis of Larynx*-----	13	5	2	6
Pulmonary Hemorrhage*-----	12	10	0	2
Ischio-rectal Abscess (Post-op. 2)*	4	3	1	0
Hydropneumothorax (Op.)*-----	3	3	0	0
Pyopneumothorax (Op.)*-----	2	1	1	0
Peritonitis (Op.)-----	1	1	0	0
Tuberculosis of Metatarsal Bones (Op.)-----	1	1	0	0
Tuberculosis of Hip Joint (Post-Op. 1)-----	2	2	0	0
Enteritis-----	2	0	2	0
Meningitis-----	2	0	0	2
Total-----	42	26	6	10

*Multiple Complications.

Table 1 gives the tuberculous complications which manifested themselves in such a manner as to render them worthy of special care and treatment. Those marked with a * oc-

curred as multiple complications in individual patients, occasionally two or three in the same case. When a fatal termination resulted, the principal causative factor is noted in that column.

Five of the thirteen cases of laryngeal tuberculosis were benefited by treatment, some of which were entirely cured, while two showed no improvement, and six died.

Ten of the twelve pulmonary hemorrhage cases improved or entirely healed. Two bilateral far advanced patients died with terminal bleeding.

Two of the ischio-rectal abscesses had been previously operated upon, and three of the four improved with routine treatment. One was unimproved.

Hydropneumothorax complicating artificial pneumothorax treatment required repeated aspiration in three cases, the fluid entirely disappearing.

Pyopneumothorax complicated two artificial pneumothorax patients in one of whom the pus disappeared after repeated aspirations, but in the other a small amount remained.

The two cases of enteritis were not benefited by several methods of treatment, probably due to their long standing and the far advanced condition of the lungs.

Meningitis developed rapidly in one patient, the first symptom being diplopia, while in the other the usual headache preceded other symptoms of a terminal nature. In both cases the lung pathology was far advanced.

Acute tuberculosis of the metatarsal bones occurred in one case of moderately advanced pulmonary disease and, after prompt removal of the two bones involved under gas-oxygen anesthesia, the patient made an uneventful recovery and has worked steadily since discharge as an arrested case.

Both cases of hip joint disease deserve comment as one patient is 26 years old and had been in a cast and brace for years, only within the past year being allowed to leave off the cast and use crutches. He now walks well without crutches or cane. The other case gave a history of pulmonary tuberculosis and traumatism in a street car accident ten years ago, which necessitated resection of the head of the femur involved and fixation of the joint. The sinus which developed after operation has been closed for several years, and the patient gets around remarkably well with a cane. The pul-

monary condition of both cases is apparently arrested, one having resumed his former occupation of clerk, and the other will soon be discharged.

Tuberculous peritonitis developed in one patient with typical symptoms and signs of acute appendicitis but, due to the advanced condition of the lungs, operation was considered a bad risk. However, the nausea and vomiting progressed with excessive abdominal pain localized in the right lower quadrant which necessitated surgical intervention. An exploratory laparotomy was done under local and gas-oxygen anesthesia. Some free fluid, enlarged glands, and small tubercles lining the peritoneum were found but the appendix was normal. The fluid was removed and the wound closed, the patient's temperature came to normal, his indigestion disappeared, and since then he has had no symptoms of abdominal pathology. He was discharged to his home in the suburbs of Richmond much improved.

TABLE No. 2.
PINE CAMP SANATORIUM.
Non-Tuberculous Complications, 1922.

Complication			Total	Improved	Unimproved	Died
Nephritis	Chronic	Interstitial				
(Op. 1)	-----	-----	6	3	3	0
Pelvic Inflammation	(Op. 3)	-----	4	4	0	0
Diabetes Mellitus	-----	-----	2	2	0	0
Carcinoma of Stomach	(Post-op.)	-----	1	0	0	1
Valvular Heart Disease	-----	-----	1	0	1	0
Tabes Dorsalis	-----	-----	1	0	1	0
Psychosis	-----	-----	1	0	1	0
Renal Calculus	-----	-----	1	1	0	0
Hemiplegia (Old)	-----	-----	1	0	1	0
Hypopituitarism	-----	-----	1	0	1	0
Intestinal Obstruction	Partial	-----				
(Post-op.)	-----	-----	1	0	1	0
Cataract, One Eye	-----	-----	1	0	1	0
Pterygium (Op.)	-----	-----	1	1	0	0
Total	-----	-----	22	11	10	1

Among the non-tuberculous complications (Table 2) which required operative intervention, three were women in which the signs and symptoms of pelvic inflammation demanded correction. The stage of disease in the lungs varied from early to moderately advanced and in all three cases gas-oxygen anesthesia was employed with good results.

The one case of renal calculus was cured by dislodging and passing the stone during catheterization.

The pterygium of one eye was removed under local anesthesia.

In the fatal case of carcinoma of the stomach (pylorus), this was discovered during a previous operation for suspected gastric ulcer, after which the patient became gradually worse and finally died due to inability to retain any nourishment. His pulmonary condition was far advanced.

The one case of partial intestinal obstruction following a former appendectomy presented symptoms of chronic constipation and periodic attacks of vomiting with abdominal pain. Due to her refusal to allow a laparotomy, the cause was not removed.

The treatment of the nephritic and diabetic patients was dietetic with the usual routine for all tuberculous cases. All of these improved except three of the nephritic cases which remained stationary. One of the nephritics required numerous abdominal aspirations of large amounts of ascitic fluid which finally disappeared and has not returned after six months.

TABLE No. 3.
PINE CAMP SANATORIUM.
Summary of Pulmonary Tuberculosis Cases With and Without Complications, 1922.

Complication				
	Total	Improved	Unimproved	Died
Tuberculous	42	26	6	10
Non-tuberculous	22	11	10	1
No Complication	36	34	1	1
Total	100	71	17	12

Of the thirty-six patients who apparently had no complications (Table 3), thirty-four improved under routine sanatorium treatment, and of these nine suitable cases were benefited or arrested by artificial pneumothorax treatment.

Only one uncomplicated case remained unimproved, and one died.

CONCLUSIONS

1. Tuberculous complications are usually of more serious prognostic significance than non-tuberculous.
2. Early recognition of both tuberculous and non-tuberculous complications with prompt medical treatment or surgical intervention offers the greatest prospect of cure or improvement.

3. The presence of pulmonary tuberculosis in any stage should not prevent surgical intervention under local or gas-oxygen anesthesia for the correction of a grave complication.

4. Complications of any nature should not be regarded as hopeless until every known method of treatment has failed.

Room 409, City Hall.

DISCUSSION.

DR. WYNDHAM B. BLANTON, Richmond: Dr. Mercer's paper is very interesting. The complications of tuberculosis are very important, and I believe clinically are often overlooked. In connection with this, will say that four or five years ago I saw a thousand or more cases of pulmonary tuberculosis. Of the seven hundred (700) autopsies studied, 37% presented intestinal infection, 24% glandular tuberculosis; 15% tuberculosis of the spleen and liver; the peritoneum and pericardium come next with something like 5%.

DR. W. NELSON MERCER, Richmond: The complications noted in this paper were clinically demonstrable in living patients and do not include post-mortem findings. Dr. Blanton's autopsy statistics serve to prove the frequency and seriousness of tuberculous complications, which should be recognized early and treated accordingly.

TWO SHORT PUBLIC HEALTH COURSES AT THE UNIVERSITY OF VIRGINIA.*

By HARRY T. MARSHALL, M. D., University, Va.

Professor of Pathology, and Member of State Board of Health.

During the last twenty or thirty years, the number of people engaged in caring for the public health has increased from a handful to the proportions of a small army. Within the same period, the responsibilities of public health officials have become more diversified. In the public health department of a large modern city or of a state, there may be twenty or more different lines of work carried by the department force. Some officials will be engrossed in matters of organization and administration, others in educational matters and publicity, others in problems of engineering, others in highly specialized bacteriological, or statistical, or nutritional fields. In addition, there will be subdivisions devoted to the special public health problems of tuberculosis; of venereal diseases; of infant welfare; of school inspector; of water; milk; foods; of sewage disposal. This incomplete list serves to indicate that there is considerable diversity of occupation to be found on a public health force. Within the subdivisions there will be still fur-

ther differentiation. As a rule, a large, well developed public health staff will include one, or several, highly trained officials; a number of officers expertly trained along one or more highly technical lines; a number of doctors who have picked up some practical working knowledge of public health matters, and who are chiefly engaged in field work; public health nurses, sanitary inspectors, etc. In this state, the chiefs of the three great tuberculosis hospitals and their staffs are also public health officials.

Where do public health officials come from? Where and how are men and women trained to become public health officials? Several of the large universities have given at least a partial answer to this question, by offering courses which prepare the graduate for leadership in the public health movement. Another partial answer has been worked out in the health departments themselves, where medical graduates, and non-medical laymen are received, given intensive practical training, like apprentices, and taken over as public health agents.

In the construction of the university courses, the directors have been guided by those ideals of scholarly thoroughness which underlie the arrangement of university courses for students of engineering, or of medicine. The students are carried through courses extending, usually, over several years, designed to give a solid grounding in the sciences relating to their chosen profession. They must acquire specific knowledge of at least the outlines of those great fields into which their professional work will carry them. They must develop a reasonable degree of technical proficiency through laboratory or field work.

It seems only reasonable to assume that graduates in public health who have spent several years in preparation, will be qualified to work into commanding positions in the various public health services of cities, states and the nation, but only in rare cases will they be content to accept humble and poorly paid positions in small towns and country districts. Now the question may be asked, "What part can a state university play in training students for these humbler positions?" A consideration of the development of public health in Virginia may be of value in answering this question.

It is only some fifteen years ago that Vir-

*Read at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

ginia began to apply modern public health methods to the State on a wide scale. At the time the State Board of Health was reorganized in 1908, there was practically no functioning health department either in the State or in the counties and, though Richmond and Norfolk had, already, young and active health offices, the other cities and towns had moved little or not at all along this line. In the fifteen years which have elapsed since the inauguration of the new State Board of Health, nearly one-half (forty or more), of Virginia's one hundred counties, and several of the cities and towns have established local health work on a whole time basis, some in an elementary way, others more elaborately. In some communities there may be only a sanitary inspector, or only a nurse, and from this minimum there will be found more and more complete organizations up to those of the large cities. Fortunately, the State law vests with the State Board of Health control over the smaller, undeveloped local health units, and the State Health Board, through professional and financial backing and direct supervision, exercises, in fact, a very real directorship over the local health work.

The establishment of health units by counties is a relatively new development, hardly any of the modern health units being over six or eight years old. They have been started as a rule through the efforts of the Commissioner of Health and his assistants acting in conjunction with groups of citizens in the locality to be developed. It is usually not easy to secure a large amount of money for such an undertaking, and in not a few rural communities there may be active opposition to, or at least distrust of the proposed innovation. It, therefore, happens that most of the county health units have humble beginnings, the idea of the State authorities being that any work accomplished will carry its own story to the county, and lead to expansion of the local unit. This theory is proving true in practice, and, in addition, the success of the county health units is proving to be a distinct incentive to some of the more tardy counties to follow the example of their neighbors. All in all, the development of local health units in counties and towns is a movement which is advancing with increasing momentum.

The progress of this movement for the building up of small local health units carries with

it an increasing demand for public health agents who will know at least how to care for the most urgent public health needs of the community, but who can be obtained for a modest salary. The position will not appeal to the highly trained public health graduate. Officers for these positions have been found hitherto largely by chance; at times when an officer is needed, an untrained man is drilled by the State health authorities until he learns enough to look after rural sanitation and a few other fundamental matters. He is then placed at work,—it may be, actually in charge of a rural unit, if he is a doctor,—and is encouraged to push forward, learning as he goes, under the scrutinizing supervision of the State health authorities. He is kept in close touch, through telephone, letters and visits, with the expert staff of the State Board of Health, so that he can secure advice or assistance from the sanitarians, engineers, bacteriologists or others in the central office. While this method of training has sufficed to meet most of the needs, up to the present, the demand for health officers is increasing at a rate that makes it advisable to plan for a stabilized training for officers of the types most needed at present in Virginia,—especially in the counties and small towns. It seems that the public health development in Virginia, with a central consulting staff supervising and advising the field workers in charge of small rural units, at the same time encourages counties and towns to engage in local public health work, and, on the other hand, creates a special question in regard to the education of public health workers to meet this demand.

A little over a year ago an opportunity arose for the University of Virginia to take a share in the training of health workers for the State. An active rural health unit, functioning successfully for two years in Albemarle County was enlarged so as to have control in public health matters over Charlottesville and the University as well as the county. The director of this unit is a member of the University of Virginia teaching staff and, in addition to lecturing, he can send his pupils to gain first hand knowledge of health problems in field work in city and county. With this organization as a foundation, the authorities at the University, after advising with the Commissioner of Health, Dr. Williams,* and his assistant, Dr. Flannagan, decided that the training

most needed to meet the present State needs includes, first, the practical, intensive training of medical graduates in the fundamentals of rural public health: and, second, the training of sanitary inspectors.

Two courses have, accordingly, been designed: a twelve weeks' course for medical graduates, and a ten weeks' course for inspectors. From our experience last session, we are inclined to believe that this course meets a growing need in the State, and that training of this type will be necessary for ten or twenty years, or until public opinion is ready for more highly organized, and more expensive rural units. In our courses, the student learns to look after rural sanitation: water supplies: school inspection, with follow-up work and clinics: maternity and infant welfare work; and public health office work.

The courses given last year covered, essentially, the subjects outlined above. We expect to mould the course in the future to meet new needs as they may develop. At present we consider it advisable to include some lectures on medical, public health and laboratory subjects, and to lay more stress on contact with the hospital and dispensary.

While we are aware that these courses are, educationally, far from ideal, we believe that organized training of this kind under university direction will ensure a more evenly trained product, and a greater supply of trained health agents, and we believe that in offering these courses we are fulfilling one of the obligations of a State university in meeting an educational need of the State. We recognize that the new courses are in the nature of an educational experiment, but it is our hope that, through control of these new courses, the University and the State Health authorities will be able to mould the education of public health agents, so as to meet the expanding needs of the State.

DISCUSSION.

DR. WM. S. KEISTER, Charlottesville: Just one word, especially as being Health Officer of Albemarle County and Charlottesville. The plan of the University is primarily to meet the State's needs, as Dr. Marshall expressed it, for trained health workers. It was with some timidity that we faced the public health proposition and started at the other end. The need is not for theoretical health officers, but rather for men who can meet the local needs. Some communities are not prepared for higher trained theoretical men; they do not want men trained in theory without practice. It is with this idea in view that

they are trying to organize in the University, a course which provides more practice instead of so much theory. There is nothing against theory, but we need practical artisans in public health rather than higher trained experts. We trust that this course will be the means of meeting the needs of the State and possibly of the South. We feel that there is a great need and some agency should be developed to meet this need.

HANDICAPS TO PUBLIC HEALTH ADMINISTRATION.*

By ROY K. FLANNAGAN, M. D., Richmond, Va.
Assistant Health Commissioner
and
Director Rural Health Work for Virginia.

INTRODUCTION.

A LARGE OPPORTUNITY.

At the outset I would like to challenge the thought and interest of the medical profession in the public health field as a career. I would particularly direct attention to the tremendous need for health service in the rural districts of the South and to the large opportunity furnished by this need for the use and development of all the qualities that make for leadership.

While the administration of a city health department is by no means a sinecure, I am in position to know that every qualification desirable in a city health officer must be more or less intensified in order to win distinguished success in the country districts. For, while principles are the same, to achieve results every method of disease control must be simplified and adapted to widely varying geographical, cultural and social conditions.

The handicaps of temperament, training or lack of experience that tend to hinder the work in town will be found to be even more of a hindrance in the country. If, therefore, what I have to say to you seems to unduly exalt country work, please be informed that it is to the most needed, and, in many respects, the most attractive public health task that my mind reverts. I even confess to a lively hope that some of you who hear me will feel impelled to accept the challenge to take up rural public health work, involving as it does the lives and well being of the most worth while folks on the American continent. I have heard of medical missionaries for foreign shores: no more devoted service to God or to man

*It is a pleasure to acknowledge our indebtedness to Dr. Williams and Dr. Flannagan for their advice and assistance.

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(synonymous terms as we all know) is possible than bringing to malaria ridden, hook-worm infested, typhoid fever and dysentery infected sections of our own Anglo-Saxon southern land the gospel of good health and the knowledge of how to secure it. For a sick body rarely houses a healthy soul.

KNOWLEDGE, VISION AND PURPOSE.

The chief factor in success in any business or profession is a knowledge of it. The more knowledge of what you are doing and where you are endeavoring to go, the better initial equipment you have. This is axiomatic. But with the highest equipment in knowledge of public health principles and practice and with the keenest appreciation of all of the implications wrapped up in the preventive idea, there have been conspicuous failures in the administration of public health departments—failures, not total perhaps, because no well planned work based on knowledge and vision is ever a total failure, but disastrous defeat and at least temporary retirement from the field with all the discouragement and loss of prestige that goes with being licked. There is an even worse aspect to it than this; a defeat in the public health field of activity, as in battle, actually means unnecessary loss of life.

It is to the causes that go to make up such defeat and the means of avoidance of them that I address myself at this time, for, to my mind, the pursuit and practice of "Preventive Medicine" offers the opportunity, and successful public health administration a goal worthy of any man's aspiration.

HANDICAPS.

Given then knowledge, vision, purpose, and a fair measure of honesty and industry, what are the things to be overcome, avoided or guarded against in the administration of the public health? I would name four as perhaps the most important:

1. Lack of sympathy with people,
2. Over confidence,
3. Stubbornness,
4. Impatience.

Over against these, on the principle of overcoming evil with good, I would place these four:

1. Love for man as man independent of his creed or condition,

2. Humility,
3. A spirit of give and take (teachableness),
4. Patience, and a faith that tomorrow will bring the fruit of today's planting.

Lack of Sympathy.—If there is one thing that might be said to absolutely inhibit success in public health work at its present stage, it is *Lack of Sympathy* with and for people as they are, which carries with it the inability to put oneself in the place of the other fellow. The quality of sympathetic understanding, which may be translated as *love* of your fellowman applied, is, I fancy, largely a matter of temperament in many cases, but it is more often a matter of training. In this connection I would like to quote a few verses from one of the later poems of Kipling—*A Pilgrim's Way*:

1. I do not look for holy saints to help me on my way,
Nor male or female devilkins to lead my steps astray,
If these be added I rejoice, if not I shall not mind
So long as I have leave and choice to meet my fellow kind,
For as we come, and as we go—and deadly soon go we—
The people, Lord—Thy people, are good enough for me!
2. Then I will honor pious men whose virtue shines so bright—
(Tho' none are more amazed than I when I by chance do right).
And I will pity foolish men for woe their sins have bred—
(Tho' ninety-nine per cent of mine I brought on my own head)
And, Amorite or Eremite or General Averagee
The people, Lord—Thy people, are good enough for me!
3. And when men bore me overmuch, I will not shake mine ears
Recalling many thousand such whom I have bored to tears.
And when they labor to impress, I will not doubt nor scoff;
Since I, myself, have done no less and sometimes pulled it off.
For, as we are, and we are not, and we pretend to be,
The people, Lord—Thy people, are good enough for me!
4. And when men do me random wrong, as oftentimes hath been,
I will not cherish hate too long (my hands are none too clean).
And when they do me random good, I will not feign surprise,

No more than those whom I have cheered by
wayside charities.
But as we give and as we take, whate'er our
takings be,
The people, Lord—Thy people, are good enough
for me!

5. * * * * *
6. Deliver me from every pride—the Middle, High
and Low—
That bars me from a brother's side, whatever
state he show.
And purge me from all heresies of thought and
speech and pen
That bid me judge him otherwise than I am
judged, Amen.
That I may sing of Crowd and King and road-
borne Company,
That I may labor in my day, vocation and de-
gree
To prove the same in deed and name and hold
unshakenly
(Where'er I go, whate'er I know, whoe'er my
neighbor be),
This single faith in Life and Death and all
Eternity,
The people, Lord—Thy people, are good enough
for me!

A man may be cold natured and yet by cultivating gentlemanly instincts and practicing courtesy to all and the discipline of listening to the other fellow and dexterity in trying to find a point of contact (even though it sometimes stretches the imagination beyond belief), or if this is impossible, the grace of silence—he may overcome and win success in the face of this natural handicap. Sympathy is a heart quality and may not be successfully simulated for long, but careful cultivation in this field, as in all others, brings fruit. Lack of sympathy is due to selfishness and the incurably selfish man or woman has no place in public health work, or in the practice of medicine for that matter.

Wordsworth says:

He whose eye is ever on himself doth look on *one*
the least of nature's works,
One, who might move the wise man to that scorn
that wisdom deems unlawful ever,
Be wiser, thou! Instructed that true knowledge
leads to love,
True dignity abides with him alone who in the
silent hour of inward thought
Can still suspect and still revere himself in lowli-
ness of heart.

Small men are not needed in the field of public health. The naturally sympathetic more easily succeed, but a large souled man will overcome handicaps of personality as he does those of knowledge by study and practice.

Over Confidence.—Another important thing

to avoid is *Over Confidence*. A lack of confidence in oneself is a serious fault in an administrator, but to be *too cock-sure* and overweening in asserting one's superior knowledge is without doubt fatal to popularity, and few people weigh enough mentally to carry such an attitude successfully. I use the word popularity advisedly for the most important single thing that a health officer must do is to establish himself and his work in the public confidence, and a lack of humility at times will undo the effect of much conscientious work. Nobody ever personally likes a conceited man. His habitual attitude towards others thrusts them into the background and injures their self-esteem. He will be tolerated if he has ability, but will be gradually shut out from the social intercourse that gives the human contacts so necessary to sympathetic co-operation on the part of the public.

Teachableness, adaptability, and deference to age, custom, experience, and perhaps, prejudice, are traits that will go a long way towards smoothing the pathway which, under the most favorable conditions now existing, will still be thorny and rough. Get a clear view of the way to go and move steadily and with confidence forward, but remember always that "pride goeth before destruction and the haughty spirit before a fall," and—watch your step.

Stubbornness.—Another stumbling block in the way of successful public health administration is *Stubbornness* in the administrator. In every community there are so many unmistakable public health needs, so many flagrant departures from proper sanitary practice, and often so many actual disease breeding conditions in evidence, that the new health officer in a crusading spirit is greatly tempted to make his program for relief on the basis of these needs and then stubbornly "hew to the line, without fear or favor." I grant that on the face of it, pursuing such a course would seem to have much to commend it, but in most instances to do so means that the health officer will have to play a lone hand and thus rarely "gets by" with it.

A city or county government that appoints him and the organizations that have probably forced the government to act in health matters will loudly vociferate when he takes office that this hewing to the line is the thing to do, but they do not mean it for when

criticisms of the health department come by reason of what seem iconoclastic tendencies, neither of these groups can be depended upon to uphold the health officer. If he has consulted with them beforehand and adjusted his activities to the possible rather than to the eminently desirable, and has gained their approval, either tacit or expressed, to a course of action, he has cleared the decks and may then proceed with reasonable assurance of support. To some men such consultation with non-professional and untrained men and women is repugnant and it is very difficult for them to admit that the compromises often suggested have any merit whatsoever, and so they avoid embarrassing themselves with conferences and in their pride of opinion forge ahead. Few health officers with such a stubborn and unyielding spirit survive their first term in office. Far be it from me to suggest that having once decided upon a desirable course the health officer should give in when criticism develops: he would never get anywhere in that case. Having made his plans after due consideration, he should be firm in purpose and bold in action without truculence. The study of each large procedure contemplated and the gaining of as complete a knowledge as possible of the elements of the problem from all angles, especially from that of the public (which presumably has become more or less adjusted to present conditions), is absolutely essential. If a board of health made up of people such as compose our town councils, our boards of supervisors, and our welfare committees, definitely oppose a contemplated course of action, it is seriously to be questioned whether the health officer can force the procedure, however desirable it may be, on the public at large. It may be wise to wait for a more propitious time, and turn his attention to the multifarious health activities that will command support. Many splendidly conceived programs are wrecked because it has not been possible to consummate them in the short term of a headstrong and stubborn health officer.

Impatience.—And this brings me to the fourth common obstacle to successful administration—*Impatience*. Each administrator of health should realize that he has entered upon a campaign, not simply a battle; he must fully appreciate that there will be many advances and many retreats, many sieges, much sapping and mining and propaganda work. The enemy

is entrenched behind custom and prejudice and careful planning is necessary to dislodge him. Before attacking, all available forces should be at hand, and the heaviest artillery in place. An ill-advised battle involving a frontal attack may mean the loss of the commander-in-chief, perhaps, a very heavy price to pay for impatience. The preventive principle can afford to wait. It clearly commands the future, so impatience and anger or ridicule directed at people who believe differently and who defend the sacredness of the ancestral dunghill or are sentimental over a fragrant draught from the old oaken bucket are unnecessary from a man who has already taught the children of the community to know the birthplace and the dangers of the housefly and has illustrated the handwashing possibilities of a wet well-rope. This teaching, like chickens, will come home to roost; just give it time, for education and time are on the side of prevention and Johnny and Mary grown up will take care of the manure pile and put a tight pump in the well if the old folks do not.

I would not have you get the idea that I advocate a waiting game exclusively, the health officer who is worth his salt is working all the time, for there is always plenty to do, but I would sound a warning against impatience and the execution of hastily conceived plans for reaching important objectives. Prepare for your fight and then go in to win with every ounce that is in you.

Medical Self-Consciousness.—In addition to the foregoing handicaps to successful administration of public health work, I would call attention to another which is a little difficult to describe in a word, but which may be defined as *Medical Self-Consciousness*. The whole trend of the training of a doctor and of his experience in the practice of his profession is toward developing this self-consciousness. The ethics of the profession forbid advertisement of his wares or work and the right-thinking doctor is, therefore, the more acutely sensitive to lapses on the part of others less scrupulous or less careful than he. This reacts on him and is apt to beget in him a species of self-righteousness.

The sense of his own importance is constantly enhanced by the reception without question on the part of his patients of his dicta and his orders in respect to their ailments. He is flattered by them and the doctor whom he

supersedes is damned, and all the littlenesses of human nature are in parade before him. It is not to be wondered at that he often becomes puffed up, self-centered and non-co-operative with his fellows and goes to the extreme in his demands upon them. This attitude along with the fundamental medical aim, the healing of the individual sick, is at the opposite end of the pole from the aims and practice of public health, and, however admirable it may be in part, it stands in the way of progress in public health administration.

DISTINCTIONS

The public health is paramount: private aims, personal feelings, dignity, tradition, and custom must retire in the face of public peril: i. e., pestilence or the threat of pestilence. The practicing physician is distinctly a private personage and his function is private. The well-being of the individual is his concern and the ills of his patrons are the business of no one but himself and them, except, in so far as the law and the public weal impose duties upon him in relation to certain of his cases. He is in fact the better doctor by reason of this personal attitude. It is the other way about with the public health officer. His business is public in every sense of the word, the individual counts for little with him, and he has nothing personally to do with treatment, though he does indeed at times bring to doctors and specialists the opportunity for great health service. His concern is not with the individual sick except as that individual is a menace to others. He will at times shut the sick one away from contact with his fellows without regard to what the ill person's feelings or his family's feelings may be in relation to the action. It is the protection of the public that engages his attention and no private viewpoint, whether of self or of the sick one, has any proper standing with him in his official capacity. (Even in this, however, he should not neglect to be human). Medical self-consciousness, therefore, must go to the scrap heap when the doctor becomes a public health officer.

PUBLICITY

The public must be fully informed as to what he proposes to do and be systematically apprised in detail of the successive steps taken in reaching the goal. The aid of everyone must be invoked in carrying out his purposes.

the department of which he is the head must, if possible, be made a household word, and the health officer must not fear to see his name paraded in the public prints. So long as the work for which he stands progresses and the rate of sickness and of death is steadily decreasing, considerations of dignity or of sensitiveness must be put aside.

SINGLE MINDEDNESS

And this brings me to the last point I wish to make. Successful public health administration demands a whole-hearted service. Either be a doctor or be a health officer. Do not try to be both at one and the same time. It cannot successfully be done; such an attempt will only lower the public health standard in your community, bring you into conflict with your professional brethren and in the end injure both interests for which you are attempting to stand. The profession of medicine offers a wide and enormously important field for the highest sort of service to humanity. The men who have won the heights in this, as in all other departments of human endeavor where social values are the measure of progress, are those who by their painstaking efforts and epoch-making discoveries freely given to mankind have brought millions within the circle of their benefactions.

The profession of Public Health offers, in my judgment, an even wider field for helpfulness to mankind. It takes the discoveries of science and translates them to the people at large in terms of health and life. Scientific truth shut within laboratory walls or within the comparatively small circle of even a great physician's contact means little for humanity. The public health officer with the service he creates and administers puts meaning and force into facts which otherwise would never, however important they are, find common application.

These two professions must go hand in hand; one is complementary to the other. If they ever seem to be antagonistic, if ever the physician observing the encroachments made by public health practice upon the formerly enlarging boundaries of his field of endeavor is tempted to place obstruction in the way, let him remember that he is but observing the growth of his own offspring and, as a father, his duty is to guide him, but also to speed him on. Then as disease diminishes and the dream

of the founders of modern medicine becomes an actuality, he can take this unction to his soul that to him and to him alone in the last analysis is due the consummation—a cleaner, healthier, and a happier world.

THE VALUE OF DIPHTHERIA TOXIN-ANTITOXIN IN RURAL COMMUNITIES.*

By WILLIAM S. KEISTER, M. D., Charlottesville, Va.

Director, Joint Health Department of Charlottesville, Albemarle County and the University of Virginia; Health Officer of Charlottesville.

I wish to thank you for the honor of being permitted to appear before you and discuss with you briefly some of the aspects of the value of diphtheria toxin-antitoxin in rural communities.

Although we now know the cause of diphtheria, its method of transmission, and its means of treatment and prevention, and have a test to determine one's susceptibility to it, yet much remains to be done before it is properly controlled. The general public must learn the importance of calling in the doctor as soon as suspicious symptoms appear, and cases of "sore throat" must not be regarded too lightly. The physicians, on the other hand, should give antitoxin promptly and when in doubt. The use of toxin-antitoxin, especially for children under school age, will be the means of producing a diphtheria-immune population in a few years, if taken advantage of by the general public.

This disease has been known since early times as accounts of it seem to have been mentioned in the Babylonian Talmud, and the Greeks believed it came from Egypt long before the time of Hippocrates. It was not until the years 1883 and 1884, however, that Klebs and Loeffler discovered the causative organism. The next great discovery in this disease came when Von Behring gave to the world diphtheria antitoxin. Although it was discovered in 1890, it did not come into active use until 1895. The influence of this discovery upon the death rate may be shown by the following results. The death rate in 1879-80 was 112.6 per 100,000; 1889-90, 97.8; and in 1899 it dropped to 45.2 and in 1918 to 13.8. In 1911 Schick published the results of his intracutaneous test and in 1913 demonstrated its

application as a practical test for immunity in the presence of exposure and gave simple means of testing for antitoxic immunity before and at intervals after injections of antitoxin.

"Von Behring on May 8, 1923, reported the early results of the injections of neutralized toxin in a small number of persons," but "he did not originate the mixture nor establish the fact that those who had no antitoxin, develop it." It remained for Park and his associates of the Bureau of Laboratories of the New York City Health Department late in 1913 to demonstrate the practical use of toxin-antitoxin injections controlled by the Schick test for the immunizing of children against diphtheria, and they "established the facts that the procedure was harmless and that after three injections about eighty per cent of those individuals possessing no antitoxin or insufficient antitoxin to protect from diphtheria, developed immunity."

In an article on "The Control of Diphtheria," by Drs. Wm. H. Park, M. C. Schroder and Abraham Zingher, of the New York City Health Department, which was read at a meeting of the American Public Health Association in Cleveland in 1922, the following very significant statement was made, which shows the need for some agent other than antitoxin to confer an active immunity upon the general population: "The fact that the improvement which continued for many years after the introduction of antitoxin has ceased and that in fact a few years ago diphtheria began to increase slowly in the United States made us appreciate that we had reached about the limit of what we could do with the old measures. It made us think seriously of using active immunization. This was with the hope of rendering the population permanently immune rather than of waiting for cases to develop and then trying to cure them and to prevent the further spread of the contagion." "Owing to the fact that diphtheria antitoxin is not a product of human cells but is made by the cells of the horse, it disappears gradually after injection from the human body, so that at sometime between two and four weeks, the antitoxin is dissipated and the immunity disappears." "Antitoxin has been most successfully used as a preventive in those who are in direct contact with cases of diphtheria, such as children in a family in which diphtheria has developed, or in institutions in which an out-

*Read at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

break of diphtheria has occurred. The only precaution necessary is not to give antitoxin as a preventive to children showing physical characteristics of status lymphaticus or giving a history of having had attacks of asthma."

According to the above observers, eighty to eighty-five per cent of deaths from diphtheria occur in children under five years of age. The United States census reports for the registration area for the years 1910 to 1914 show that 62.2 per cent of deaths from diphtheria, 95.2 per cent whooping cough, 80.6 per cent measles and 53.9 per cent scarlet fever occur under five years of age. Are not the above figures sufficient evidence to cause us to use every means to protect the dear little ones from these diseases? Unfortunately we have no adequate means of protecting them from the last three diseases but, by using diphtheria toxin-antitoxin during this early age period, many lives can be saved and a diphtheria-immune population produced. Park and his associates found in a large number of persons who were given three injections of toxin-antitoxin that "about eighty per cent of those individuals possessing no antitoxin or insufficient antitoxin to protect from diphtheria developed immunity." They also found that, with few exceptions, they retained the immunity over a period of six and one-half years. Many observers are inclined to feel that the immunity produced is permanent, at least observations of a large number of persons inoculated would indicate it. During two years in New York City since the use of toxin-antitoxin, the number of cases of diphtheria diminished twenty per cent and the death rate decreased from twenty to sixteen per 100,000. No doubt all the credit cannot be given to toxin-antitoxin but must be shared with the plain antitoxin which is now more generally used. In a comparison of 90,000 children inoculated with toxin-antitoxin and subsequently Schick tested, with 90,000 children who received no protection, it was found by Park that four times as many children developed diphtheria among the control cases as among the tested cases, although there were only fourteen cases of diphtheria among the tested children and some of these did not take the full series of three inoculations. It would seem that all Schick positive cases may become negative if a sufficient number of series of inoculations are taken. There are very few positive after one complete series of inoculations,

and it is rare to have a positive after the second series. Before six months of age the child usually has an immunity received from its mother, but Park considers it advisable to immunize all children between six months and six years of age with three injections of toxin-antitoxin, irrespective of the results of the Schick test. After six years of age (or even before), most workers give the preliminary Schick test (especially in urban communities), and later immunize the positive cases. It is advisable, where possible, to do a Schick test on all immunized persons in three months to a year or more after the toxin-antitoxin injections to see if the immunity is present. If the test is positive, another series of injections should be given. The toxin-antitoxin injections are given in a series of three inoculations a week apart, though it is permissible to give the first inoculation along with the Schick test.

In carrying out this work in rural communities, the problems met with are somewhat different from those of cities. Some of the difficulties met with in the country are: 1. Difficulties of transportation over poor road frequently and for long distances and often in bad weather, which make it necessary to make as few trips to a single school as possible. 2. Indifference of the public toward all public health measures, especially something new, and lack of sufficient co-operation, particularly when there is no imminent danger of contracting diphtheria. 3. Ignorance regarding disease and the use of sera, etc., and the difficulty in explaining the value of the Schick test and the use of toxin-antitoxin, and 4. The fear of local reactions as a result of the treatment. It is largely because of the above difficulties that we do not feel justified in Albemarle County in insisting upon a preliminary Schick test, even though such a procedure may be desirable and more scientific. Yet we feel that there is no contraindication to the use of toxin-antitoxin for everyone and can see no real reason why everyone desiring it should not receive it, even though some may already be immune. The writer has advocated its use by the physicians of the county since 1920, but it is only in the past year or so that it has been used extensively. Our own experience with it covers a period of nearly two years. During 1922 we gave 2,476 injections and in 1923 to date 294 injections making a total of 2,770 injections,

and without a single serious complication. At first the preparation used frequently gave some rather strong local reactions, which were temporary, especially in older children, but in the case of the new, less toxic preparation, the reaction has been practically nil. The latter result has aided greatly in securing the confidence of the children and carrying on the work. Each c.c. of the original preparation contained 3L + doses (120 lethal doses) of toxin and 3.5 units of antitoxin. The new preparation is made by adding $\frac{3}{4}$ of a unit of antitoxin to 1L + dose (40 lethal doses) of toxin, and each c.c. contains 1/10L + dose of toxin. In the case of either preparation, the dose is 1 c.c. for all persons over one year of age and $\frac{1}{2}$ c.c. for those under a year. The local reactions when present are due to the autolyzed bacillus substance (protein), and the new preparation eliminates most of this. As a public health measure, the writer feels that the use of diphtheria toxin-antitoxin at the present time is even more valuable as a life saver and in the prevention of disease than the vaccination against smallpox, notwithstanding the increase in recent years in the prevalence of the latter.

To summarize briefly: 1. Diphtheria is a disease about which we know the cause, method of transmission, means of treatment and prevention and have a test to determine individual susceptibility, and yet the morbidity and mortality rates are entirely too high, largely due to (a) the ignorance of the public, and delay in sending for the doctor, (b) delay on the part of the physician in using antitoxin and in sufficient amounts and (c) serious complications and sequelae.

2. Antitoxin should always be used as a therapeutic measure when in doubt. It lowered the death rate from 112.6 per 100,000 in 1879-80 to 13.8 in 1918.

3. The death rate from diphtheria under five years, in 1910-1914, was 62.2 per cent of the total deaths from this cause in the United States. This is the period of election for the use of toxin-antitoxin, although the schools are more accessible for this work.

4. There are no contraindications to the use of toxin-antitoxin, and the protection derived from it appears to be permanent. It is now possible to bring up a diphtheria-immune population.

5. The writer considers it inadvisable to give the preliminary Schick test in rural com-

munities, as he does not feel that the advantages to be gained overcome the disadvantages.

6. The local reaction has largely been eliminated by the use of the new preparation.

DISCUSSION.

DR. P. K. GRAYBILL, Fincastle: I would like to ask Dr. Keister a few questions. I understand it takes from eight to twelve weeks to produce immunity. Suppose in that interval a child develops diphtheria, would toxin-antitoxin tend to lighten the case and prevent complications?

If a teacher in a primary grade develops diphtheria during school, should the pupils in that grade be given immunizing doses of antitoxin or toxin-antitoxin?

DR. M. PIERCE RUCKER, Richmond: Dr. Keister's statistics about mortality in young children confirm my opinion that obstetrics is the most important branch of medicine. The only way you can better these figures is for the obstetrician to take a hand. I have been in the habit of giving my patients weight cards. On the bottom of these cards I have printed: "Vaccinate child against smallpox at three months. Immunize against diphtheria at eight months."

DR. R. L. PAGE, Batesville: In connection with Dr. Keister's paper, I wish to report the results of the use of toxin-antitoxin in Miller School. Assisting Dr. Keister, we gave three hundred injections. I am glad to report that there has not been a single case of diphtheria in that institution in the older children—no signs at all. Usually before this, we had several cases in the Fall and Winter, but since then we have had none. I am very much pleased with results.

DR. W. H. RIEBLE, Wytheville: Something like fifteen days ago I had a case of diphtheria. A sister slept in the bed with the patient, the night before. I gave the sister prophylactic dose of antitoxin, and the patient 10,000 units. Ten days after this I sent swabs from both to Health Department for examination—the sister's was positive—the child who had diphtheria, negative.

DR. WM. S. KEISTER, Charlottesville: I am glad that I have stirred up some questions. However, some are right hard to answer. As I understand it, one of the chief drawbacks is that it takes from six to twelve weeks to develop immunity with toxin-antitoxin. We inoculated most of the children in Albemarle County at the time of a diphtheria outbreak. We have to ride a horse when he is ready. We urged the people to be protected before the school term opened. I wrote to the different teachers to please let me know if any would like to be inoculated before the Fall session. I received one letter in reply. It is very difficult to get the fullest cooperation from the school authorities and parents. The opportune time is when no diphtheria is present, but we feel, from a Public Health standpoint, that the time to do the work is when we can get the people to take advantage of it.

Out of twenty-seven hundred inoculations, one child developed diphtheria about ten days after the third inoculation. We do not guarantee that immunity will develop in that time. I believe that where children have been closely associated with cases of diphtheria, antitoxin is worth more. I do not think it advisable to inoculate a whole school because of the danger of anaphylaxis. It seems that when there is no diphtheria, people are not interested. I personally feel that it often takes some little time to develop immunity, but I believe that quite a few get

protection in less than the average six weeks. I have not had enough experience to tell whether toxin-antitoxin makes the case any milder, but I should think it would be milder. It does no harm to give toxin-antitoxin to those directly exposed to diphtheria.

In regard to the question of whether to give toxin-antitoxin or straight antitoxin, it is hard to say. We did a rather peculiar thing in Nelson County. Some of our Albemarle children were in school across the line in Nelson, and we considered that an excuse to go over.

Dr. Sizer, of Schuyler, had had experience with some sixty odd cases of diphtheria. These had run on for several weeks and the people were very anxious to open school. It was a question what should be done. We decided to "strain a point." We gave every child a prophylactic dose of one thousand (1,000) units of antitoxin. On account of the danger of anaphylaxis many of the physicians in Albemarle have hesitated to give it in this way. It is sometimes permissible, however, where physicians see the case every day and observe closely the other members of the family to wait to give them antitoxin until symptoms occur. In regard to anaphylaxis, some feel that desensitization is one way to get around it—giving about one-half c.c., waiting about fifteen minutes, giving another one-half c.c. and waiting fifteen minutes, then another, and waiting fifteen minutes, etc.

I am very glad Dr. Page said a word about Miller School. When a case of smallpox broke out we vaccinated every living soul, the laborers, pupils and others. Although there were marked symptoms of smallpox, not another case occurred and there has been none since. Every pupil was also inoculated with diphtheria toxin-antitoxin.

Throat cultures are examined by the Laboratory of the State Board of Health. A negative culture does not mean anything in diphtheria. If the physician has any idea there is a case of diphtheria, he should not wait for laboratory diagnosis. He should give antitoxin, then if the laboratory diagnosis confirms his opinion, he can pat himself on the back. I think the thing to do is to give antitoxin in five, ten, or twenty thousand units. Do not wait until the Board of Health confirms your clinical diagnosis.

THE ROENTGEN RAY TREATMENT OF CERTAIN NON-MALIGNANT CONDITIONS OF THE UTERUS.*

By A. L. GRAY, M. D., Richmond, Va.

Radiotherapy, including both roentgen and radium therapy, for deep-seated malignancy, whether of the uterus or other of the less superficial viscera, has been followed by some measure of success. While the newer methods of measurement of dosage and means of obtaining the desired depth dose are giving increasingly encouraging results, these results are still far from uniform and can not be predicted with even a fair degree of certainty.

There are, however, other conditions of the uterus which, though they may not present so hopeless an outlook for their victims, nevertheless may cause as complete disability, as intense pain and, unless subjected to the dangers and suffering of a major surgical operation, as definite a fatality as is usual in uterine carcinoma. In these conditions it can be safely stated that radiotherapy has proceeded beyond the experimental stage and may be classed as practically a specific.

The conditions referred to in the foregoing statement comprise uterine fibroids, uterine hyperplasia, as fibrosis of the myometrium, hypertrophy with or without hemorrhage; certain menstrual disorders accompanied by alarming systemic or nervous manifestations and idiopathic menorrhagia or metrorrhagia.

Shortly after the advent of the Coolidge tube I was called upon by Dr. Stuart McGuire to treat a lady with a uterine fibroid approximately the size of an adult head. This lady had been referred to him for hysterectomy, but the hemorrhage had been so profuse and of so long duration that her hemoglobin was too low and the blood volume so reduced that he declined to operate and resorted to various means to ameliorate her condition, but without material benefit. The tumor was irradiated through twelve portals by the intensive cross-fire method. Following the second series, an interval of four weeks having elapsed between the first and second, all bleeding ceased and the patient rapidly regained her blood supply. A third series was given, after which the operation was done successfully and an uneventful recovery ensued. The size of the tumor was also materially reduced.

Since this beginning it has been my privilege to administer deep roentgen therapy for fibroids of all sizes from the smallest palpable nodule to the size of a six months' pregnant uterus. In no case where the treatment was not interrupted by an over anxious patient or physician, has the result been other than the complete disappearance of the growth or its shrinkage to such an extent that it ceased to produce inconvenience and patient failed to return for further treatment.

As compared with surgery, I may summarize the advantages and disadvantages in the average case as follows:

*Read at fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

SURGERY.

1. Results obtained after total disability in a hospital and at home from 6 to 8 weeks.
2. Mortality risks and suffering incident to a severe major operation.
3. Results after complete recovery definitely permanent.
4. The usual nervous manifestations of the menopause may often be delayed by leaving a portion of a healthy ovary. This may, however, be followed by cyst formation and a subsequent operation may be necessary.
5. Opportunity afforded to examine tumor for malignancy.

RADIOTHERAPY.

1. Results obtained gradually in 12 to 24 weeks, with no disability that did not previously exist.
2. No mortality risk nor suffering, except a transient nausea and slight malaise in 50% of cases.
3. Recurrences may arise in a small percentage of cases requiring further irradiation.
4. In large fibroids it is difficult or impossible to cause a disappearance of the tumor without destroying the ovarian internal secretion.
5. No such opportunity except in sub-mucous fibroids.
6. The economic advantages are markedly on the side of radiotherapy.

In the second class of cases in which there is no definite tumor present, but where a hyperplastic condition exists, often attended by severe menorrhagia or a persistent metrorrhagia, unless there be some other accompanying lesions, as ulceration, polyps or malignancy, a definite cure may be expected in two to four series of treatments. A case illustrative of this class is as follows:

Mrs. S., w. f., age 49, multipara, referred by Dr. W. L. Peple, had been having severe menorrhagia for the last several periods. Hemorrhage profuse and continuing with only a few days' cessation between the periods. Weak, anemic and nervous.

Pelvic examination by Dr. Peple revealed a uterus three times its normal size, hard and fibrotic. Roentgen radiation was administered through four ports of entry, cross-firing on the uterus. Bleeding ceased and did not return after first treatment, but, with a view to producing a complete menopause, two additional series were given at four weeks' intervals. Following her third treatment she was returned to Dr. Peple for another examination. He reported that the uterus was then about normal in size, possibly slightly smaller than the average, was freely movable and showed

no abnormality. There has been no recurrence since her discharge one year ago.

Illustrative of the third class: Mrs. Y., w. f., age 42, nullipara, was referred by Dr. Stuart Michaux, on account of menorrhagia, dysmenorrhea and a reflex or nervous vomiting that seriously threatened her life from emaciation and exhaustion. Her menstruation continued at regular intervals with slight improvement, until three series of treatments had been given, after which it ceased. A fourth series was administered in order to insure a permanent menopause.

Patient has continued to improve, but has always been of a neurotic type. There has been no return of the former trouble since the last treatment, five months ago.

In women, during the child bearing period it is possible in many instances to re-establish a normal menstruation rather than produce a complete cessation. That this may be accomplished even in the presence of a fibroid is shown in the following case:

Miss W., age 22, had abandoned her employment as a secretary, on account of severe menorrhagia, which had caused confinement to her room and bed for a considerable portion of the preceding six months.

She was referred by Dr. Stuart Michaux with a diagnosis of a small uterine fibroid. Four series of roentgen ray treatments were given before menstruation ceased, but none was given thereafter. Menstruation was stopped for two months only, after which it returned and has since been entirely normal. Examination by Dr. Michaux showed a complete disappearance of the fibroid.

As to the after effects on patients in whom a premature menopause has been produced, the results as compared with surgery are about the same. In my own experience I have observed that there are as a rule fewer and less intense reactions the nearer the patient's age approaches the normal climacteric and in younger women I have thought that the manifestations were of a lesser degree when stoppage was more gradual. Authorities agree that the treatment in no way affects sexual desire or gratification.

In conclusion, it seems that there are distinct fields for both surgery and radiotherapy in the treatment of these non-malignant conditions. Surely it would be unwise to await

the slow action of radiotherapy in any case in which the delay would be detrimental to the patient; as for example in alarming hemorrhage, possible early malignancy where a cure might be effected by a surgical removal, or where a total disability already exists in a patient who is a good surgical risk. Perhaps it is better to remove by myomectomy small subperitoneal fibroids in women during the earlier child bearing period, but in other cases falling in the three groups before mentioned there seems to be abundant evidence to prove that radiotherapy is the preferable procedure.

Since the effects of radium and the roentgen rays are so nearly identical the choice will depend upon the physical factors. Radium introduced into the uterus produces its effects more promptly, but control of the dosage is probably more difficult with radium than with the roentgen rays, and there is also added the risk of the surgical procedure required for its introduction.

The importance of a correct diagnosis can not be too strongly stressed. Where failure has resulted it will perhaps usually be found that some unrecognized complication has existed.

300 *Medical Arts Building.*

MESENTERIC TUMORS.*

By JULIAN L. RAWLS, M. D., F. A. C. S., Norfolk, Va.

I am lead to report these two cases of mesenteric tumors because of the apparent rarity of this class of tumors. The latest reports that I can find record about two hundred cystic tumors of the mesentery and only one hundred solid tumors. I am inclined to think that there are a good many isolated instances of mesenteric tumors that are not on record, either because the operator did not think them of sufficient importance to justify reporting them or else because of unfortunate results.

However, Dr. Edmund L. Bartlett, of the University of California Hospital, reporting cases of mesenteric cysts, states that for over a period of five years in one thousand five hundred and seventy-two (1572) laparotomies only two cases of mesenteric cysts have been seen at the University Hospital. He also states that "In none of the instances reported was the clinical diagnosis correct and for the

most part the true condition was not even suspected."

Carter, writing in *Surgery, Gynecology and Obstetrics* in November 1921, reports a case of mesenteric cyst in a young Indian girl operated on for appendiceal abscess. He also states that no reported case has been diagnosed previous to operation.

Keen's Surgery states that mesenteric cysts belong to the rarities of surgical observation, though they seem to be four times as common as solid tumors of the mesentery.

The cysts may be serous, chylous, hemorrhagic, dermoid and echinococcic. The solid tumors may be lipoma, sarcoma, carcinoma and fibroma, fibroma being the least common.

Ewing states that chyle-angioma of the mesentery is a cavernous lymph-angioma containing milky fluid which arises from congenital or acquired obstruction of the lacteal vessels.

As we have seen, the accurate diagnosis is almost impossible before operation. If seen early, before they have reached a large size and before inflammatory changes have fixed them, we should have a movable tumor without very severe pain. Wilensky states that the free mobility of the tumor is the most important single symptom and that, if in addition it can be demonstrated that the intestine maintains a fixed position to the tumor and is movable with it through several examinations, a presumptive diagnosis of mesenteric tumor is justified. A barium series with pictures taken with the patient in different positions might throw some light on the subject. At times they may cause obstruction by pressure or a twist in the mesentery. This, of course, is a surgical emergency and the obstructive symptoms overshadow the original symptoms.

Two methods of treatment are suggested for the solid tumors, enucleation or resection of the bowel with removal of the tumor. One of four methods may be tried with the cystic tumors, enucleation, resection of the bowel with removal of the tumor, incision and drainage and marsupialization. Aspiration certainly has no place in the surgery of today.

Vance states that the operative mortality is high. The twenty-seven cases which he collected had an operative mortality of 41%. Wilensky states that resection adds to the operative risk and should be avoided if possible. He goes on to say, however, that in

*Read by title at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

those cases where the overlying intestine is centrally placed and a tumor bulging both leaves of the mesentery equally, or if the growth is adherent to the gut at its wall or involved in the process, resection should be resorted to at once.

With this rather brief survey I wish to add two more cases.

CASE I. John Horn, thirteen years old, school child.

C. C. Painful mass in lower right side of abdomen.

F. H. Father died with rheumatism. Mother died suddenly during pregnancy. One brother and two sisters living and in good health. No T. B.

P. H. Measles and pertussis. Influenza 1920. In 1918 he had an attack diagnosed as appendicitis. He was in a hospital for two months. He developed a mass in his right lower quadrant which was treated by electricity.

P. C. Ever since this attack four years ago, he has had some pains in his abdomen. He has not vomited but food gives him cramps. His pain is worse at night. He is obstinately constipated. He is very active when not having pain in his abdomen. He was taken to the King's Daughter's Clinic where he was seen by Dr. Lawrence Royster and referred to me for operation.

Physical Examination: Well nourished and well developed white boy, apparently not very sick. Head negative. Pupils react normally to light and accommodation. Tongue clean and moist. Teeth in good condition. Neck negative. No palpable glands. Chest negative. Heart and lungs normal. The abdomen is negative except for rigidity and tenderness on right side, most marked in lower right quadrant. There is a suggestion of a mass around his appendix which is tender on pressure. External organs of generation normal except for phimosis. Both testicles are in the scrotum. Limbs are negative. Wassermann negative. Urinalysis negative. White blood count 6500.

Diagnosis: Probably tuberculosis of the caecum.

At operation a firm hard mass was found occupying the mesentery of the lower ileum. It was firmly attached to the bowel and movable with it. The intestine was clamped on either side and the intestine and tumor were

removed with a cautery knife. Before an anastomosis was made, it was seen that one end of the gut did not have sufficient blood supply to take care of it and a further resection was necessary. Then an end-to-end anastomosis was done, a chronically inflamed appendix was removed, and the abdomen was closed in layers without drainage. The following day his condition was not satisfactory, he was vomiting bile, and his pulse was rather rapid. He was given a gastric lavage and a large amount of dark brown fluid returned. After that his convalescence was uneventful except for a superficial infection of his wound which added to his stay in the hospital. He was discharged on his twenty-fourth post-operative day, with the wound practically healed.

The following is a report of Dr. Roche of the tissue sent to the laboratory: "The tissue consists of mesentery with loops of small intestine forty-four cm. in length and another piece of intestine fourteen cm. in length. Occupying the mesentery is an indefinitely outlined mass involving the wall of the mesentery at one point. The mass has a grayish, roughened external surface with raised yellowish nodules scattered here and there over the external surface. On section through the center of the mass, the cut surface has a dark red spongy consistency, showing many dilated and cystic vessels from which milky fluid mixed with blood exudes. Appendix sixteen cm. long, external surface smooth, meso-appendix very fat, lumen filled near distal end with fecal masses. On section, mucosa for about two cm. from proximal end appears normal. From this point to the distal end there is a marked hypertrophy of the mucosa which is covered by a hemorrhagic exudate.

"Frozen sections of the mesenteric tumor show dilated lacteals and lymph spaces. The lymphatics surrounding the tumor show a simple hyperplasia. Diagnosis: Chyle or lymph angioma."

CASE II. B. S. Colored woman. Age 21 years. Married.

C. C. Pain in lower abdomen on both sides.

F. H. Negative.

P. H. Negative, except that in 1919 she had an abdominal operation by a colored physician for "ovary trouble," and has not menstruated since. She has been married five

years and has had one full term pregnancy, no miscarriages.

P. I. Began three months ago, gradual onset with pain in both sides of lower abdomen. There has been intermittent nausea and vomiting ever since the onset. She states that she has lost thirty-five pounds in weight in the last three months. She has been constipated ever since she has been sick. A physician was called to see her who told her that she had a "pus tube" and needed an operation.

Physical Examination: A well developed but rather poorly nourished colored female. Weight one hundred pounds. Head and neck negative throughout. Chest negative, heart and lungs normal. Abdomen—operative scar in mid-line. There is some abdominal distention, with tenderness and rigidity over the lower abdomen. A mass the size of a coconut is felt above the symphysis. On vaginal examination the cervix is normal and the stump of the uterus can be made out supravaginally. Tubes and ovaries are not palpable. There is nothing in the cul-de-sac. The limbs are negative, reflexes, normal.

The most probable diagnosis, recurrent ovarian malignancy.

She was operated upon May 17, 1922. The omentum was found adherent to the stump of the cervix and broad ligament. The uterus, both ovaries and tubes had been removed at the previous operation. On freeing this adherent omentum, the tumor was found to lie between the layers of the mesentery of the lower segment of the ileum, with several centimeters of the ileum densely adherent to it. The gut was clamped on each side, burned through, and the tumor removed. It was found that in removing the growth it had been necessary to sacrifice about fifteen centimeters of the mesentery on each side. This free intestine without sufficient blood supply was amputated with a cautery and an end-to-end anastomosis completed the operation. The abdomen was closed without drainage. Very little blood was lost during the operation but the patient had a fair amount of shock and was given fluid subcutaneously several times during the next forty-eight hours; after that her convalescence was uneventful. She was discharged from the hospital on June 5th, twenty days after her operation. Shortly before leaving the hospital she complained of pain over McBurney's point and developed some tenderness and rigidity of

the right rectus. She had a slight acceleration of the pulse rate and a leucocyte of 14,000 but no rise of temperature.

Following is the pathological report of Dr. Roche: "The tissue sent to the laboratory consists of a large irregular mass in the mesentery, 18 by 18 by 16 cm. External surface rough and irregular. Center of mass is oval shaped, hard, and resembles a uterine fibroid. Extending entirely over the mass, passing over the top and down either side, crossing in front at the lower edge of the tumor is a loop of small intestine. The lumen of the intestine is free except on top of the mass where the attached surface has ulcerated through and formed a fistula ending in a cavity in the tumor mass. The cavity is filled with a foul smelling substance made up of undigested food, blood clots, etc. Whole partly decomposed strawberries can be made out. The cavity is about 12 cm. in depth and communicates on either side with the lumen of the small intestine. On section the wall of the hard central mass is composed of loose white fibrous tissue showing few blood vessels. Lining the cavity is a smooth glistening surface resembling mucous membrane but is more firm. Parts of the cavity show a rough granulated surface with a purulent exudate and much hemorrhage surrounding it. Microscopically the lining of the cavity showed no evidence of mucous membrane. Two small pieces of small intestine showed marked congestion, otherwise normal. Altogether 90 cm. (about three feet) of small intestine were resected. Frozen sections made from the lining of the central mass and parts of the wall showed fibromatous tissue similar to fibromata found in the uterus.

"Diagnosis: Fibroma of the mesentery, adhesions of small intestine to the mass, necrosis and ulceration of intestines.

"The question of a diverticulitis with resulting inflammatory change has to be considered. This seems hardly probable since the mass lay entirely within the leaves of the mesentery and the cavity was not mucous lined and the sections showed fibroid tissue with few blood vessels."

The first tumor has been classified as a cystic tumor but it was not a true cyst as solid tissue predominated and the mass resembled very much a sponge.

142 Main Street.

OVARIAN CYST WITH REPORT OF AN UNUSUAL CASE.*

By J. COLEMAN MOTLEY, M. D., F. A. C. S.,
Abingdon, Virginia.
Surgeon to Johnston Memorial Hospital.

A certain element of surgical romance will always be associated with ovarian cysts because of the pioneer work of Ephraim McDowell. Our whole experience in the realm of abdominal surgery had its beginning in the first ovariectomy by this fearless doctor. During recent years mammoth tumors of the ovary have been quite rare because of the very simple reason that they fall into the hands of a surgeon and are removed before they attain great size.

Histologically, the very large cysts are usually cystadenomas that arise from the remains of Pfluger's tubes or the Wolfian body. Cystic tumors that arise from the Graafian follicle usually do not grow to large size.

In 1922, J. W. Ward reported a cyst weighing 221 pounds. Unfortunately his patient died one hour after the removal of the tumor. Ward reported from a review of the literature five cases weighing more than 225 pounds, viz: Binkley 225 pounds; Tuffier 235 pounds; Bullitt 245 pounds; Barlower 298 pounds; and the very remarkable case of Spohn in which he estimated the weight of the tumor at 328 pounds. Four other cases of more than 200 pounds are recorded, twenty-nine weighed more than 150 pounds and seventy-eight more than one hundred pounds.

Dr. J. S. Horsley, in 1911, reported the successful removal of a cyst weighing 116½ pounds. In 1900, J. B. Bullitt (quoted by Horsley) collected from the literature up to that time twenty-two operated cases of ovarian cysts weighing more than one hundred pounds. Bullitt reports the case operated on by A. M. Cartlege and himself, weighing 245 pounds, to which reference has already been made. This case died from intestinal obstruction one week after operation. Of the twenty-two cases reported seven died, a mortality of 32%, so it can be readily seen that these patients are relatively poor surgical risks.

In the case I wish to report the tumor is rather small compared with some which have been recorded, but the condition was unusual

in my experience and I hope the brief history of the patient will not be without interest:

Mrs. D. H. D., case No. 7713, age 51, admitted to Johnston Memorial Hospital May 11th, 1923, complaining of an abdominal tumor of 25 years' duration. One paternal aunt had a similar tumor. The family history was otherwise negative. The patient has always enjoyed good health. She has suffered with considerable constipation in recent years on account of the pressure of the tumor. Had a severe illness 32 years ago, which was probably typhoid. A mild attack of influenza during the first epidemic. She had a prolonged cough during the past winter and has had nasal catarrh for many years. Appetite and digestion always good. No urinary symptoms. Married 31 years; five children, 3 living and well; two still-births. Passed her menopause three years ago.

Present Illness—About 25 years ago the patient first noticed that her abdomen was beginning to enlarge. Seventeen years ago she was examined by a physician who told her that she had a "sac of water" in her abdomen. The tumor has been gradually increasing in size until the past winter when she became practically helpless because of the weight and pressure. Six or seven years ago there was a sudden decrease in the size of the tumor until she was almost normal in the waist-line, but the tumor soon began to enlarge again. She



suffered considerably with shortness of breath when the tumor suddenly disappeared. She feels well now except for the burdensome weight of the tumor and the obstinate constipation. She states that at times she "belches up gall."

Examination—Patient is a woman of small

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frame, good color and healthy appearance. Eyes, head and mastoids negative. There is an atrophic rhinitis. There are no teeth except a few snags and roots. Temperature and pulse normal; blood vessel walls soft. Blood pressure, systolic 165; diastolic 95 mm. The heart is pushed upward by the abdominal tumor so that the apex beat is in the fourth interspace 9 c.m. to the left of the midsternal line; the heart is regular, has a good muscle tone and there are no murmurs. The chest is negative, except for the bulging out of the rib margins by the abdominal tumor. There is a moderate anterior curvature of the lumbar spine, probably due to the weight of the tumor. Abdomen: occupying the whole abdomen is a huge, symmetrical tumor. The distance from the superior to the inferior pole is 43 inches; from side to side 46 inches. The tumor is smooth and tense but cystic in character, and there is a distinct fluid impulse on one side when tapped on the opposite side. Pelvis: the uterus can be felt pressed down behind the abdominal tumor. Blood count: W. B. C. 8,200; polys. 87%. Urine: albumen slightest visible trace, with two to four r.b.c. to the high power field, a few bacteria, otherwise negative. Impression: mammoth ovarian cyst.

On May 12th operation was done. A low right para-median incision was made. The cyst was found to be adherent to the entire anterior parietal peritoneum. A small nick was made in the cyst wall, a large rubber tube was thrust into the cyst cavity and the fluid

contents syphoned off into a barrel. The opening in the wall was then closed, the cyst dissected free from its dense adhesions to the abdominal wall, its pedicle ligated, and the sac removed. The abdomen was closed with a gallon of hot salt solution left in the cavity. A considerable quantity of the cystic fluid was spilled while the tube was being placed in the sac for syphonage. What was collected, with the cyst wall, weight 107½ pounds.

The day before operation the patient weighed 240 pounds. Two weeks following the operation her weight on the same scales was 105½ pounds.

Her post-operative course was fairly uneventful except that for about a week she had a relative paresis of the intestines and her bladder was retentive. The bowel paresis was followed by a few days' incontinence, and following this there were several days more of alternating constipation and diarrhoea.

In a personal letter, dated August 21st, the patient writes: "I can say I am thankful to tell you all that I am getting along just fine. Feeling better than I have for several years. I will soon be strong enough to do all my house work. I now weigh 125½ pounds."

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HOW DOES RADIUM PRODUCE ITS RESULTS?*

By A. P. JONES, M. D., Roanoke, Va.

The underlying principle that abnormal tissues are more readily affected by the rays of radium than are normal tissues is now universally recognized, and forms the starting point for all radium therapy.

This simple statement, however, is entirely too vague, too much of a "glittering generality," to satisfy the inquiring mind, or to furnish a measure of the effects of a given dosage. Many investigators have, therefore, made studies of the histological picture presented by tissues which have been exposed to the rays of radium.

A recent case of my own demonstrated very nicely the sequence of events after treatment with radium, and suggested the title of this paper.

The patient, Mrs. J. W. P., aged 55, was

*Read at the meeting of the Southwestern Virginia Medical Society in Abingdon, September 6 and 7, 1923.



first seen on February 22nd, of this year. At that time she had on the outer surface of the right thigh an elevated nodule about the circumference of a dime, not pigmented, but with a history of recent rapid growth. A gross diagnosis of epithelioma was made and radium applied. At the end of a month, though decreased in size, the growth was still evident and treatment was repeated. Two further treatments were given and finally, on August 1st, not satisfied with the progress made, I excised the growth with the cautery.

Study of frozen and paraffine sections showed the following interesting features:

At first glance the feeling was that a mistake in diagnosis had been made, as the whole field seemed to be filled with fibrous tissue. Closer study showed, however, occasional, widely separated clumps of definite epithelial cells, completely cut off by the encircling strands of connective tissue. These epithelial cells were of the type seen in an ordinary squamous celled epithelioma, four to twelve in a group, and very evidently degenerating. The cell outline was irregular, the cytoplasm small in amount, and the nuclei irregular in staining and vacuolated. In a word, what we have is an epithelioma undergoing fibrosis and this shows a late stage of the process.

In looking up the literature, especially as quoted in Simpson's "Radium Therapy" (C. V. Mosby, 1922), one finds that the sequence of events following the application of radium may be divided into two distinct stages. The first we may call the Stage of Destruction, and the second the Stage of Repair.

In the Stage of Destruction, the curious and interesting feature is that the effect is delayed for a period of two or three to ten days, in marked contrast to the immediate result of cauterization. Microscopic study shows that the elements of this tissue most affected are the nuclei of the epithelial cells which rapidly begin to go to pieces, and a little later on the injury to the capillaries and the invasion of the polymorphonuclear and mononuclear leucocytes is observed.

Soon the fibroblasts make their appearance and with them is instituted the Stage of Repair, which goes on, as we have seen, to a replacement of the original growth by fibrous tissue.

The similarity of the process to the familiar phenomena of inflammation and repair by

granulation tissue has been recognized by all of you.

It becomes evident, then, that the penetration of the radium rays, and the correspondingly wider zone of affected tissue, constitute the only real difference between the reaction to radium and the familiar picture of inflammation and repair.

Jefferson Hospital.

SUBACUTE BACTERIAL ENDOCARDITIS IN CHILDREN.*

By W. C. CAUDILL, M. D., Pearisburg, Va.

That subacute bacterial endocarditis is more common than was formerly thought is evidenced by the many recent reports of various observers. The fact that it is commonly met with and difficult of recognition is my object in presenting this paper.

I prefer to speak of this condition in children, not because the etiology, pathology or clinical course of the disease is so different from the same condition found in adults, for it is very much the same, but because I feel that due emphasis has not been given this grave malady in childhood. However, it is not as frequent in children as adults, which is probably due to the fact that it arises for the most part in individuals who have had previous inflammation of the heart valves with permanently damaged leaflets, or is engrafted upon a congenital heart lesion. Clark, in a recent article in the *Journal of the A. M. A.*, has dwelt entirely upon this latter phase of the disease and states that in children, in whom both congenital and acquired cardiac affections are frequent, it is surprising, as Cautley has pointed out, that bacterial endocarditis is not more common than it is. In my opinion, the congenital heart lesion is one of the most important predisposing factors of subacute bacterial endocarditis in children.

The exciting organism is usually the streptococcus viridans which Aschoff suspects is a modified pneumococcus. The Bacillus diphtheriae, however, as well as the staphylococcus, meningococcus, the pneumococcus, the Bacillus coli, the Bacillus anthracis, the gonococcus, and other organisms, have been found in some cases in the absence of the streptococcus.

Subacute bacterial endocarditis should be considered to be of secondary origin in all cases. The avenues of entrance of the infecting agent

*Read at the meeting of the Southwestern Virginia Medical Society at Abingdon, September 6 and 7, 1923.

are numerous. The blood is furnished with the specific organism from any source to which infection may be carried and from which the blood current is infected. The essential point to remember is that the condition is the result of a bacteremia and the source of infection be determined if possible. An effort should be made to determine the specific organism by repeated blood cultures, but it is unfortunate from the bacteremic point of view that blood cultures are so often sterile in malignant endocarditis. Smith says, "Certainly they seem to be more uniformly negative in the early period of the disease, at the very time when they could be of the most value in diagnosis and in treatment, than they are later in the condition when the patient is desperately ill."

I have already mentioned that this condition is difficult to recognize, and this is especially true in the early stages of the disease because in many cases the purely cardiac symptoms are in the background and the first thing that calls our attention to the heart is embolic manifestations.

Billings in 1909 reported a series of fourteen cases and stated that in one patient the symptoms began two years before the real condition was recognized. One case began fourteen months before a definite diagnosis was made. Another patient probably suffered from the disease for more than two years, and in the early part of the illness, the diagnosis of typhoid was made for a condition which was, in all probability, infectious endocarditis, the diagnosis having been based on the fact that there was fever and splenic enlargement.

Yet of the various forms of endocarditis in children, the subacute bacterial type presents the most definite clinical picture. The disease may be insidious or precipitate in its onset. It is usually insidious and for weeks or months the child may not appear to be very ill. The chief complaint may be slight headaches, gastro-intestinal symptoms, painful joints or pains in the left upper quadrant of the abdomen. The fever is continued over a long period of time and is usually of comparatively low grade, though it may reach 104° to 105° and is irregular and remittent in type. Leucocytosis is practically always constant and is an important aid in diagnosis. There is progressive weakness and emaciation with marked pallor and anemia. The spleen is usually enlarged, palpable and tender. Painful cutaneous nodules may be found upon the hands and feet.

Clubbing of the fingers may or may not be present. Erythematous and petechial rashes are common and chills and sweating are usually present during some stages of the disease. Embolism may cause the most diverse manifestations, among which are embolic pneumonia, delirium, coma, hemiplegia, monoplegia, and central derangements of vision and hearing in consequence of implication of arterial branches in the brain or meninges. There may be pain in the lumbar region and bloody urine from infarction of one or both kidneys, resulting in a glomerulo-nephritis.

Now add to this clinical picture the knowledge of the pre-existence of a heart lesion, either congenital or acquired, and if these symptoms are kept constantly in mind, it seems to me that a diagnosis of subacute bacterial endocarditis should be made certainly within the first few weeks of the disease, even though the blood cultures and cardiac findings are negative. I wish to report the following case:

History: H. S., a girl, aged seven. Congenital heart lesion was discovered a few days after birth. Father suffers from angina pectoris. Mother has had more or less rheumatism all of her life. Five sisters, all living and in good health; no brothers.

Patient had a severe attack of diarrhea at nine months of age. Had measles and another attack of diarrhea at age of three. Had an attack of pharyngeal diphtheria in November, 1921; 15,000 units of antitoxin was given and patient made an uneventful recovery. The heart showed no signs of distress at any time during or following the attack, and the blowing systolic murmur, which had been present since birth, remained practically unchanged. The tonsils remained hypertrophied and injected until tonsillectomy was done in November, 1922. Another attack of diarrhea occurred in February, 1923, and from this time on the patient did not feel very well.

The active symptoms of the present attack began in March, 1923. The patient had a slight epistaxis, also diarrhea, and complained of headache and soreness over abdomen, which was intensified over the splenic area. The temperature ranged from 100° to 102° , and was always higher in the afternoon. A provisional diagnosis of typhoid was made in spite of the fact that the blood count at this time was 12,000, but was later ruled out by a still higher leucocyte count and two negative

Widals. The temperature continued an irregular, remittent course, being almost normal for a few days only to recur again. The patient was bright and did not seem very ill. Leucocytosis remained constant and reached as high as 36,000. Gas and slight soreness of the abdomen was still present and an increasing degree of pallor could be noted. Kidney intoxication in some form was next considered most probable. The urine showed slight albumen, a few red cells, and a few hyaline and granular casts. There was no clubbing of the fingers, no petechiae, and no painful nodules in the hands or feet. Endocarditis was suspected but a positive diagnosis was not made until the latter part of June, when a typical attack of embolic pneumonia occurred. The pneumonic process cleared up after about ten days and the lung remained clear until August, when there was a second attack similar to the first. Since June an increase in the transverse diameter of the heart has been noted as well as frequent changes in the character and intensity of the murmur. The course has been steadily downward with increasing weakness, pallor, and anemia. For the past few weeks hematuria has been more or less constant. The temperature curve remains the same. There is still no clubbing of the fingers and no petechiae. At present the patient is in a state of extreme emaciation, complete anorexia, rapid pulse, mild delirium, and the end is not far off.

No blood cultures were obtained in this case on account of the profound nervous irritability of the patient; but I do not doubt for one moment that she is dying from subacute bacterial endocarditis.

NOTE:—The patient died September 8, 1923.

INFLUENCES AT WORK ABOUT THE INFANT.*

By DANIEL M. MOORE, M. D., Stonega, Va.

Man is the superior being of the animal kingdom. He heads the list as the most intelligent, has the highest state of mental development and towers over all others and uses them to serve his purposes in his various pursuits. But this is man in his adult life. Where does he stand at birth? The frog distributes her eggs in some quiet waters and

goes about her business, the ostrich lays her eggs in the sand to be hatched out by the sun, the young calf can walk at birth and has intelligence to know the source of its food supply, while the house cat comes into this world with its eyes closed and is cared for by its faithful mother until it can better care for itself. But of all helpless and dependent creatures the human infant heads the list. Ascend the scale of animal life and notice how nature, as she increases the intellect, also increases the responsibility of the parent to care for the offspring! This responsibility rests heavily on the human race. Nature has endowed the lower animals with an instinct for self preservation in many respects that man has to learn by experience and transmit to his offspring by precept and example. The young squirrel or monkey knows what foods are suitable and what are poisonous. Consequently, they do not have to contend with a string of diseases that come as a direct result of indiscretions of early life. If mortality statistics were available among lower animals for the first year of life, they no doubt would show a sad reflection on the intellect of man, however high his state of enlightenment may have attained. We, no doubt, have gone far astray from nature's way in caring for the young and it is up to us to get back to nature's way if we are to measure up to the responsibilities that she has placed upon us. What influences are we as physicians bringing to bear toward the betterment of the offspring of the present day generation? Are we not responsible to a degree for this wandering away from nature's way? Let us consider for a while some of the influences that are at work about this little tender piece of humanity, the infant; and surely there is nothing in this world more susceptible to influences.

Some one has said that "The life history of the individual depends upon three great factors, viz; heredity, environment, and the will." Since we are dealing with the infant primarily, of course the last named, the will, has not come into play yet as far as the infant itself is concerned, but we may bring influences to bear on that life that will enable the will of that infant later on in life to help the next generation in a variety of ways.

Every human being has a multitude of ancestors representing as many lines of life which in the end go to make up a heritage that

*Read before the Wise County (Va.) Medical Society.

is indeed complex. The influences along these lines are as numerous as the sands on the sea shore and too appalling for finite mind of man to comprehend, but we shall consider them only as to how they may be applied to the present generation and thereby improve the heritage of this and succeeding generations. Every human organism has a threefold existence, namely; the ante-conception, the antenatal, and the post-natal. In the ante-conception period there are of course two separate and distinct germ cells upon which these hereditary influences play their important role. Have we stopped to think of the influences we are wielding on preconceived life in our every day battle with diseases? Isn't our mission, while primarily aimed at the relief of human suffering, most vitally concerned with improving the heritage of those yet unborn? Are we not missing the opportunity of our lives for leaving the world better by having lived in it when we lightly pass the buck on the present day venereal question? A heavy toll has been exacted by this grim monster not only in the death rate but in stunting and dwarfing the bodies and minds of those that are cursed by its influence. The tubercular question also gets in its work not so much by direct inheritance but through its tendencies. Alcoholism has done its share toward breaking down the heritage of multitudes. These great national movements along these lines have as their ultimate object and aim the improvement of the present generation and the heritage of succeeding generations. Venereal prophylaxis has a great future ahead of it and it will succeed in so far as the medical man is willing to lend his aid in educating the youth of the land to the terrible effects that follow in the wake of his experimental youth. They put a light regard on these matters and who but the medical man has the opportunity to impress the seriousness of these affections not only upon the youth himself but his posterity after him? Eugenics will come to its own in the no great distant future and will no doubt exert a very beneficial influence along these lines. Therefore the great bulk of hereditary influences must be applied to the present generation in order to be beneficial to the next. The influences that may be brought to bear on antenatal life are not so numerous, but none the less important. The obstetrician here comes in for a large responsibility as respecting the

child, for his care should begin with conception and extend up to and include the delivery of the child. It is up to him to keep that mother in as sound mental and physical health as possible in order for the child to be healthy. Maternal impressions, however much these may be ridiculed, we are bound to admit exert a tremendous influence on the child *in utero*, and the mother's mental state should be under constant supervision.

Granted now that we have a normal healthy newborn babe and a normal healthy mother. Heredity has, as far as this child is concerned individually, done its work, and from now on it is to be a struggle with environments. We are all more or less familiar with these environments and what a struggle the little fellow has if he is to survive. We shall not recount these struggles and their effects but suggest some influences that may be brought to bear on this little life that will tend to increase the child's chances in this struggle. The average present day mother has very little knowledge of the duties and responsibilities of motherhood and it is precious little that the schools and colleges are doing toward instructing the future mothers. She realizes her handicap and is as apt and eager a pupil as you will find in any school. Are we going to leave her to pick up a smattering knowledge from some old experienced though misguided mother that has raised a dozen scrawny children? Take a little time and give this mother some fundamental principles on which she can build. Tell her the importance of a well regulated life and diet for herself, make her promise you that she will nurse her child every three hours and no more, tell her how to bathe the baby and what clothes are suitable for the time of the year, the importance of fresh air, etc., and if you have gained her confidence your time will have been well spent for she will take in more than you might give her credit for. Make yourself available to her as an information bureau and do not permit her to repeat the follies of some older mother and learn in the bitter school of experience what she might have learned from you had you only taken a short time for that purpose. Some day this mother will be the old mother in that community and she in turn will be instructing other mothers and we perhaps have started a stream of influences whose scope and end we do not know.

Great things have been accomplished in the last few years in the way of artificial feeding of infants. Many infants owe their lives to these accomplishments but, however great they may be, they are being abused, and we should take care that they are not turned into a curse. The breast fed infant has a chance on life that is worth two or possibly three of that of the artificially fed infant. Cases are few and far between in which a mother is totally unable to breast feed her infant. Jacobi, who has just recently passed to the great beyond, once said that "There is no such thing as a non-lactating mother." The supply may be inadequate and it may be necessary to supplement the supply with some artificial food but do not allow a complete substitution because of this fact alone. The most despicable failure of all failures is the mother that fails to nurse her child when there is no valid reason why she should not, unless possibly it be the doctor that permits such practices to accommodate some fashionable or lazy mother. We must take care that these benefits that have been derived from the advances along these lines are not offset by the series of disadvantages that will naturally follow if these practices are carried beyond the field for which they were primarily intended.

The chief business of the infant is to grow and develop and it is our business to see that every influence is brought to bear upon both parent and child that will produce the strongest tendencies toward bringing this about. We need to emphasize the fact that an infant is not a play thing to be disturbed and fussed over by every one that comes near it, but that it must be kept quiet and surrounded by clean fresh air. Cold dry air is not such a curse as the average mother thinks and short exposures to it each day do a great deal toward raising the child's resistance to disease. It is during these sudden changes in the temperature about a child with a low resistance that various diseases gain their entrance and bring about their deadly work. Study the mortality curve during the twelve months of the year and you will find that it reaches its peak during the hot months. There are two main reasons for this; the depressing effect of excessive heat (the same results can be brought about by too much clothing), and the favorable conditons present for the growth and proliferation of pathogenic bacteria in and about the child. Much

can be accomplished toward this end if we can educate the mothers to the importance of regulating the heat and cold about the infant. They are extremists in these matters and if we can instill a little rational procedure into their minds we may save the lives of a great many babies, and at the same time pass the effect on to the next generation.

The acute infectious diseases reap a great harvest each year from the infants in the first year of life. Many infants have given up their lives as a result of some mother's indifference in exposing them to these diseases with the thought uppermost in mind of "letting them get it and get through with it." Let us impress the importance of protecting these little tender lives from these affections, at least until they are more able to withstand the onslaughts that accompany these acute diseases, and our reward will be the saving of many lives as well as the health of many individuals. We should make an attempt to teach the parents the seriousness of these affections and show them how much better chance the child will have if it is kept away from these until later on in childhood.

As you have probably already noticed, I have attempted to bring out the importance of the doctor as an educator as well as a healer in his dealings with the infant. It is up to us to take these matters seriously in hand if we are to keep up with the times along the line of prophylactic medicine which is just now beginning to come into prominence in medicine, but will be the field to receive the greatest amount of attention in the future.

THE CARE OF TUBERCULOUS PATIENTS WITH REFERENCE TO THE PRE- VENTION OF GIVING THE DIS- EASE TO OTHERS.*

By J. B. NICHOLLS, M. D., Catawba Sanatorium, Va.

The purpose of this paper is to present to you briefly some measures whereby the tuberculous patient may be rendered safe to other people with whom he may come in contact.

All of us realize that tuberculosis is spread from one person to another either through ignorance or carelessness. With the number of people who are dying from tuberculosis in Virginia from year to year, we can readily

*Read at the meeting of the Southwestern Virginia Medical Society in Abingdon, September 6 and 7, 1923.

see that we have many cases of tuberculosis with us all the time which are a menace to other people, and especially to those with whom they are daily living. Past experience has shown that a tuberculosis sanatorium is a safe place in which to live; and the object of sanatorium treatment is not only to teach the patient how to recover as far as possible, but to teach him also the necessary precautions to carry out in order to prevent giving the disease to others. I would not consider a tuberculosis sanatorium a safe place in which to live, if some measures were not practiced in order to render the patient safe, so far as protecting those around him is concerned.

The adult is less susceptible to the repeated infections of the tuberculosis germ than is the child. The measures I am going to present to you offer protection to people of *all* ages, but I wish to lay special stress upon the protection of children. The heavily infected children of today will make the tuberculous patients of tomorrow. The individual, who may be spoken of as the "careless" consumptive, may give the disease to anybody of any age; and he is a source of great danger to those who have not reached adult life.

In order to prevent tuberculosis, we must certainly consider—along with the other well known principles of proper regulation of life and habits—the *destruction* of the germs which are being thrown off from the tuberculous in the expectoration and cough.

The following directions carried out carefully, in disposing of the discharges and the things that come in contact with the discharges from the patient, will prevent others from getting heavily infected and from the probability of developing the disease.

The "open" case of tuberculosis, which is expectorating bacilli from time to time or all the time, should be separated to a certain extent from the other members of the family; he should be made to see that it is necessary that he sleep alone and in a room alone; that it is dangerous to have any one else in the room with him; that it is very necessary that children be kept out of his sleeping room day and night; and that he should have as little furnishings in the room as possible to make it comfortable, but that he should have all the light and ventilation that is available. It is better still for him to have some arrangement

for sleeping out of doors on a porch, in order that he may be removed from the confinement of a room, thereby lessening the chance of the room's becoming heavily infected. He should have separate dishes to eat and drink from, and they should be boiled for ten minutes each time after using them. All articles of food which are left after meals should be burned.

Teach the patient that it is dangerous for him to expectorate promiscuously and that he should have sputum cups in which to expectorate, and that they should be burned after using them. Sputum cups may be obtained at very little cost.

The spray emitted by the cough ejects fine particles of mucus from the mouth and respiratory tracts, and the germs of tuberculosis are found in the fine droplets. Cover the mouth and nose with a handkerchief or paper napkin when coughing and sneezing. Especially should this matter be emphasized as a precautionary measure when the patient is in a house and in close contact with other people.

Let the tuberculous mother know that she is spreading a heavy infection and that she will eventually cause the child to have tuberculosis, if she does not carry out carefully these precautions. The child should be taken away from the "open" case of tuberculosis, if possible; but I realize this will hardly be possible in a number of cases.

Stop the promiscuous kissing of children by grown people. The child should *never* be kissed in the mouth and not at all by the tuberculous.

Everything that comes in contact with the tuberculous patient should be sterilized by boiling—or should be burned if not of any further use. The soiled bed clothes should be kept separate and boiled. The person who waits upon the patient should wash his hands after handling the patient or after handling anything that comes in contact with the patient. Keep the fingers and other objects out of the mouth. This is a thing we all should do whether attending the sick or well.

Any sputum which has been spilled on the floor should be wiped up with a rag which has been soaked in a 5% compound cresol solution. Then pour on more solution and let it stand for an hour on the place where the sputum was spilled.

The bed-ridden case should be isolated as far as possible, and only adults should be allowed

to visit the room. In many cases of this type there is an involvement of the intestines and urinary tracts. The "stools" and urine of such cases should be handled just as carefully as those of typhoid cases. Disinfection may be carried out in these cases by adding to the excreta an equal quantity of 5% cresol solution, or a 3% chlorinated lime solution and letting it stand for four hours.

The disinfection of a room after the removal of a patient should always be carried out carefully. Rubbish should be burned. Linen and all washable things should be wrapped in a clean sheet and boiled. Woodwork and furniture should be scrubbed with either a 5% phenol preparation or a 3% chlorinated lime. The walls should be refinished where possible, and wooden walls should be scrubbed as the other woodwork is treated. There should be no carpets or rugs in the room which can not be properly disinfected afterwards or burned. Follow this by opening the room to ventilation and to the sunlight for a period of at least a week.

Patients who do not cough or expectorate at any time are not of any real danger, provided they have been instructed to use the simple precautions of keeping their fingers and other objects out of their mouths, and of keeping the hands clean, and of not using the same drinking cup or eating utensils.

If we physicians will make a real effort to teach people how tuberculosis is spread from one person to another, it will not be a hard task to get them to use these simple measures of prevention. They should be made to realize that the responsibility rests upon them, after they have had the proper knowledge of the spread of the disease. Let us all remember that the so-called "careless" consumptive *is* dangerous; but that the person who has tuberculosis and who has been instructed properly *is not* dangerous, so long as he carries out these precautions.

DIAGNOSTIC CONSIDERATION OF THE GONOCOCCUS AND OTHER DIPLOCOCCI IN CHRONIC URETHRAL INFECTIONS.*

By THOMAS V. WILLIAMSON, M. D., Norfolk, Va.

The common staphylococcus, growing on the urethral mucous membrane, may take on a

diploid form and be Gram-negative. It may be identical in size and shape with the gonococcus and, when it is associated with a history of Neisserian infection, it may be, and frequently is, mistaken for the gonococcus. Indeed, a positive history is not imperative for this mistake to occur. The laboratory detects this degeneration form of the staphylococcus in disturbances of the genito-urinary mechanism, both in children and adults in whose record no history of gonorrhea whatever may be traced. It is a frequent occurrence to find organisms in chronic urethral, prostatic and seminal vesicular discharges which, when treated with the basic analine stains alone, cannot possibly be distinguished from the gonococcus. The micrococcus catarrhalis, an infrequent and mildly active inhabitant of the urethra, is also Gram-negative. Thus, it is clearly evident that, in the class of cases under consideration, a positive diagnosis of gonorrhea cannot be made with uniform accuracy when either the basic analine stains or the Gram method are the sole criteria. The case history, the complement fixation test, and culture, plus the microscopic findings, are the essential elements upon which the diagnosis should rest.

The Case History.—The first few minutes of association with a patient enables the examiner to arrive at a fairly comprehensive opinion of what findings may be expected in the case. Subsequent examination often reveals the fact that the inference drawn from a detailed history is conclusive and correct.

A history of an acute infection, following recent exposure, clearly indicates a pure gonorrheal invasion. But the physician is riding to a fall, if he relies on the history and physical findings alone for his diagnosis. He must find diplococci in the discharge in characteristic numbers, grouping and staining reactions before he can safely say that a given acute urethritis is gonorrheal. Instances of typically acute urethritis occur in which gonococci can never be found. However, this contingency does not frequently obtrude itself into the diagnosis.

This is one extreme. The other extreme presents itself in those cases wherein an infection has persisted for a long time. The longer an infection has lasted the less possibility there is that gonococci will be found. It is rare, indeed, to demonstrate their presence after a

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lapse of three years. They usually disappear in much less time than that under careful, adequate treatment. The time limit of three years may be relied upon with a fair amount of certainty. Both laboratory and clinical experience vouch for this conclusion. A recent series of fifty cases of chronic urethritis giving a reliable existence history of over three years, were subjected to culture, complement fixation test, and microscopic examination in this office. In none of them were gonococci found. Therefore, a true history of infection time is of paramount importance.

In those infections occupying an intermediate position between the two extremes, the history also plays a decided role. The unwary may slip up here; while the alert examiner, if his investigations follow the direction pointed out by the history, will clear up many puzzling cases. For example: A patient presents himself with a story of recurring attacks of acute urethritis without fresh exposure. Between the attacks, he is apparently rid of gonococci since none can be found by ordinary examination. Granting that the history is reliable—and in spite of an ingrained propensity in these patients to lie, it is always an excellent practise to do this—an intensive diagnostic study is in order. Repeated provocative therapy to the urethra, prostate and seminal vesicles may set up a reaction on the part of the culpable micro-organisms which permits easy recognition by the laboratory. Negative microscopic findings from a single examination should not be conclusive. Especially is this true if the complement fixation test is positive. Repeated examinations will often succeed where a single one fails. In any case, the history should be given equal rank with the other elements entering into the complex.

From this brief dissertation on the case history, it will be seen that the following conclusions may be made:

(a) A history of acute infection following exposure points with fair certainty to a gonorrheal invasion.

(b) A history of an infection dating back three years or more indicates, almost conclusively, that gonococci no longer exist.

Complement Fixation Test.—The complement fixation test is a modification of the Wassermann technique in which a gonorrheal antigen is substituted in place of the syphilitic preparation. It was first employed in 1906 by

Meüller and Oppenheim for the diagnosis of arthritis. They found that it gave a positive reaction in the gonorrheal type of the disease. Swartz and McNeil¹ later applied the test to all forms of the disease.

Briefly, the findings with the test are as follows:

(a) That the results are negative in the first few weeks of a Neisserian infection, due to the fact that sufficient antibodies have not been developed within the blood to induce a positive phase.

(b) That the blood gives a positive reaction after the first few weeks when the gonococcus is undoubtedly present.

(c) That a positive reaction is sometimes obtained in cases apparently clinically cured when all other tests fail to detect the presence of gonococci.

(d) That the test is sometimes positive for weeks or months after clinical cure, by reason of the fact that the system is slow to eliminate the antibodies which gave rise to the positive phase.

(e) That, when a short time has elapsed after clinical cure, it is uniformly negative.

The conclusions arrived at by the pioneers with the test have been abundantly substantiated since that time. They are quite striking and it is rather remarkable that this laboratory procedure has not been more universally employed by the profession. The conclusions are:

(1) A positive reaction, except within the narrow limits described above, is indicative of a focus of infection remaining in the body and is sufficient ground to refrain from pronouncing a cure, to interdict intercourse, and to prohibit marriage.²

(2) The gonococcus fixation test is of undoubted value in chronic gonorrheal infections.³

(3) A non-gonorrheic does not give a positive complement fixation test.⁴

(4) Positive culture is more certain evidence that an infectious lesion persists than a positive fixation test. Nevertheless, the practitioner will be wise to rely more upon the complement fixation test than upon any thing else for the diagnosis of gonorrhea.⁵

The chief value of the test to the clinician is: (a) The ease and certainty with which unpolluted specimens are obtained. This is not true of culture.

(b) To establish or rule out the presence of gonococci when other means are doubtful.

(c) To determine if an infection is a recurrence or not. Should a specimen, taken within three weeks from the time symptoms appear, be negative, the disease is of recent origin. Should the reverse be true, a recurrence may be suspected.

Culture.—Ever since Bumm (soon after its discovery by Neisser in 1879) succeeded in growing the gonococcus on artificial culture media, the technique has been difficult to carry out and variable in result. A positive culture is, of course, absolute proof of gonorrheal identity. However, the organism is so frequently mixed with other bacteria which tend to obscure it, or kill it in the test tube, and it dies so quickly at a temperature but a few degrees above or below that of body heat, that uniformly accurate results are not achieved by culture. Therefore, a negative return is not conclusive evidence that the urethra or adnexa do not harbor the pathogerm.

The value of culturing the urethral discharges is not confined to the gonococcus alone. There are the Gram-negative micrococcus catarrhalis and the involution or pleomorphic forms of the staphylococcus to contend with. In contradistinction to the gonococcus, which grows only upon specially prepared food, these bacteria thrive luxuriantly on most ordinary culture media. The staphylococcus, in the presence of albumen,⁶ may be either Gram-negative or Gram-positive. Its variation in size and shape sets the practitioner an impossible task to distinguish it from the gonococcus under the microscope with diagnostic certainty. Martin, of Norfolk,⁷ has shown that these confusing diploid forms of the organism will, on repeated culture and subculture, revert to the true coccus shape and be consistently Gram-positive.

It must be remembered that the micrococcus catarrhalis rather infrequently inhabits the urethra and its appendages. It is troublesome when it does appear but, fortunately, this is not often the case. It is entirely different with the degeneration types of the staphylococcus. They abound there much more freely and are a major source of uncertainty and perplexity when a positive opinion as to definite etiology is desired. It is a great relief to have culture methods clear up this maze.

It would seem that by causing the staphylo-

coccus to revert to type, culture renders its most valuable service.

The writer is inclined to believe that, in many instances, bacteria resembling the gonococcus under the microscope, but which fail to grow as such on culture media, are merely the diploid forms of the staphylococcus to begin with. Instead of diplococci they show as cocci on the culture plate. There is then a reversion to type from pleomorphism in a single culture, no reculture being necessary to identify the staphylococcus. It is quite probable that culture of the gonococcus is much more reliable than it is credited with being, and that the masquerading staphylococcus, through its inconsistent impersonation, is often responsible for the apparent failure of culture for the former organism.

Microscopic Findings.—In the early frankly acute stages of gonorrheal urethritis, a positive diagnosis can be arrived at with a reasonable degree of certainty from microscopic findings alone. The organisms are quite numerous, characteristic in intracellular grouping, true to diplococcic form, unassociated with other bacteria, and respond without variation to fresh staining reagents. The discharge is composed principally of polymorphonuclear leucocytes which evidence an active phagocytosis.

As the severer symptoms fade and wane into the declining stages of inflammation, the microscopic picture rapidly changes. Leucocytes diminish in number, phagocytosis is less active, desquamated epithelial cells and mucous filaments appear, and other bacteria become identified with the morphology.

Normally, the urethra harbors an infinite variety of bacterial flora, which is not pyogenic until an avenue of entrance is created for it. The gonococcus opens the gate by passing between the epithelial cells, thus causing a loosening and desquamation thereof. Then the parasites, awaiting without, pass in and become pyogenic. They seem to be more virulent and aggressive, and more resistant to germicides than the gonococcus; eventually, they appear to be the sole survivors in the urethral feeding ground. The morbidity then consists of a secondary infection supplanting or following a primary gonorrheal implantation.

For the most part, these secondary organisms do not take on the microscopic characteristics of the gonococcus. This observation does not

hold good with the micrococcus catarrhalis or the pleomorphic types of the staphylococcus.

The catarrhalis is a true Gram-negative diplococcus but, as a rule, it is not near so numerous as the gonococcus and is much larger. It is a bold outstanding bacterium. It is clean cut and sharply defined. Careful focusing will reveal a faint halo around the gonococcus which tends to make its outline less sharp than its prototype. The gonococcus is usually clumped in small groups while the catarrhalis is more generally disseminated throughout the field. The catarrhalis is not intracellular. From the verbal picture, the distinguishing points are clear. Nevertheless in chronic discharges, where leucocytes are few, where phagocytosis is feeble, and where the gonococcus is swollen in degeneration stages, the inexperienced microscopist may become confused.

The staphylococcus may be both Gram-negative and Gram-positive in the same specimen. In shape, it may range from the round coccus to the coffee bean diploid form; while in size, it may vary widely in the same seemingly irresponsible manner. This helter-skelter behavior is what makes the staphylococcus so confusing since somewhere in the great range of variation, it may be about the size and shape of the gonococcus and be Gram-negative. Under such conditions the finger of suspicion naturally points to the staphylococcus, but culture and the fixation test are needed to prove its definite identity.

To the writer, the most striking point in the visual detection of the staphylococcus is its apparent affinity to epithelial cells. It is strongly attracted to them. It appears in greater numbers around or superimposed upon these flat cells than elsewhere in the specimen. When thus situated, it seems to be more uniformly diploid than when it is free or entangled in mucous shreds. In many chronic urethral discharges the only organisms observed will be seen resting on epithelial cells.

Therefore, in such discharges, where there is a considerable percentage of epithelial cells; where there is an absence of true phagocytosis; and where the majority of diploid organisms rest upon epithelial cells, the evidence is strongly presumptive that the staphylococcus is the offender. Indeed, this is a practical certainty.

Thus we see that, in the finer points of diagnosis, the subject of chronic infections in the

urethra is rather complex. In dealing with them, the physician would be terribly handicapped if the facilities of the modern laboratory were denied him. Can we wonder then that, in the years gone by, there should have been a generous measure of misconception regarding their etiology? Professional observation of the disease inevitably leads to the conclusion that the vast majority of those who have suffered a gonorrhea have happily married and that from the union no evil consequences have resulted. We know that when there is a transmission of the disease there is also, if the truth be known, almost invariably, a history of recent infection in the partner transmitting it. No prudent man is willing to say how long the gonococcus does or may survive in the male urethra, but experience, plus the aid of the laboratory, gives us the courage to say that when clinical signs of the disease are gone, the danger of transmission is past. An intelligent and unremitting co-operation between the clinician and laboratory expert certainly relieves the gonococcus of much of the odium once attached to it and places the blame at the door of the rightful perpetrator of the trouble—a trouble, which, although it cannot be transmitted to others, may do an immense amount of injury to the genito-urinary mechanism of its possessor.

The necessity for correct knowledge of the etiology of urethral inflammations cannot be overstressed. These morbid processes affect a function which has a vitally important bearing on the happiness of the human race. Dr. Paul B. Barringer says that "the reproduction of species is the goal of individual existence." Since this is so, it follows naturally that a disease which hinders the performance of this function is a distressing calamity. It may prove to be a calamity in two ways. Should a superficial examination fail—as well it might—to reveal the presence of gonococci, the ensuing consequences would be a sad commentary on the carelessness of the practitioner, when the sum of their far-reaching effect is totaled. On the other hand, should an organism masquerading as the gonococcus be mistaken for it, the effect on the patient himself is not pleasant to contemplate. Nothing is more demoralizing and devitalizing to manhood than for an individual to believe that he is a gonorrheal carrier and may remain so for years.

I recall four referred cases in my own work which may serve to illustrate this point quite forcibly to medical men. Two were doctors; two were dentists. All four had had a gonorrhea at some time in life. Slight urethral catarrh yet existed. They desired to marry but dared not do so because diplococci, which has been confused with the gonococcus, had been occasionally found in the urethral smears. An intensive laboratory study succeeded in ruling out the gonococcus. Marriage followed with no consequent regret.

In conclusion, it is safe to say, that nowhere in the broad field of medicine is exact knowledge of the etiology of disease more imperatively essential than in the manifestations dealt with in this article.

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Spratley Building.

FOCAL INFECTIONS.*

By FLETCHER D. WOODWARD, M. D., Newport News, Va.

The title Focal Infection should really grace a comprehensive monograph, but I will make no such attempt. If I should be able to give you a brief resume, and serve to freshen your memories and stimulate the search for them as a cause of disease, I will be content.

In attempting a definition, I will say Focal Infection is a broad term—meaning a circumscribed point of infection, causing remote tissue involvement, not by continuity or contiguity, but by the lymph or blood stream due either to absorbed bacteria or bacterial toxins.

The most frequent sites are the teeth and tonsils, in which locality pus, under pressure by mechanical means of chewing and swallowing, creates diffusion into the blood stream. Other less frequent sites are nasal accessory

sinuses, ear, intestine, gall-bladder, appendix, kidney pelvis, seminal vesicles, prostate, uterus, cervix and lymph nodes; others have been reported and still others are yet to be added.

The type of infection most frequently found in some member of the hemolytic streptococcus group or streptococcus viridans, probably because these bacteria are such poor antigens that immunity, if produced, is transient, according to Rosenow. The symptoms caused by these infections are legion and when one goes through the literature of reported cases he is tempted to add to the old adage about syphilis—know focal infection in all its manifestations and you will know medicine. Its study is rapidly changing our ideas as to many forms of chronic diseases, and at the same time making the phrase "etiology unknown" appear less frequently in our text books.

Recently, C. P. Jones¹ reported a clear cut case of "Interstitial Keratitis Due to Apical Abscesses" and, while we all know that syphilis is the cause in the vast majority of such cases yet there have always been cases in which it could not be proven, but focal infection is not mentioned as a possible cause even in our most recent texts.

It might be added here that in all of these types of diseases in which focal infection might play a role we should not stop our search even when syphilis or some apparent cause is found—even in acute appendicitis, gastric ulcer, acute pancreatitis, etc. Our duty has not been fulfilled until a thorough search for them has been made and eradicated, if found.

Realizing that preventive medicine is our ultimate goal, we must constantly search for, and correct these infections from infancy through old age, as our one greatest weapon in attaining this goal. Clinical studies have furnished proof that they are present in a high percentage of the sick, and removal was followed by improvement in general health or cure of the disease present, at which time we have frequently noted an immediate exacerbation of the systemic condition, which is significant of causal relationship, followed by improvement or cure. There are also many cases in which removal has had no effect. These are apparently due to the fact that the secondary processes are themselves acting as foci.

Autogenous vaccines made from bacteria in the original focus will help in this type of

*Read before the Walter Reed Medical Society, Yorktown, Virginia, October 10, 1923.

case, but here again we also find them of little value at times—perhaps due to the fact that fibrosis has gone on to such an extent that antibodies are unable to reach the focus.

E. C. Rosenow has perhaps done more than any other man to bring our attention to this subject and, while his experiments are often harshly criticized and his results questioned, one need only to review his work to become convinced of his sincerity and the correctness of his conclusions.

He² has produced elective localization experimentally in endocarditis, appendicitis, gastric ulcer, cholecystitis, rheumatic fever, erythema nodosum, herpes zoster, myositis, etc., and in these experiments localization has occurred more often in the specific organ than other tissues in the body. These results have all been verified.

He has also produced gall stones and renal calculi in 87% cases in dogs following devitalization and infection of teeth with strains isolated from cases of nephrolithiasis. These conditions he³ considers hematogenous because the lesions in cholecystitis, ulcer of stomach, pancreatitis and appendicitis, in early stages, are often sharply circumscribed, hemorrhagic, and situated in mucosa, submucosa, or peritoneal coat, with no evidence of diffuse involvement of mucous membrane, while experiments to produce gastric ulcer by feeding bacteria are unsuccessful, and also failure to produce cholecystitis when injected directly into the lumen of the gall-bladder.

Since streptococci in teeth and tonsils may have elective localizing power, he places them in the front rank of importance as sources of hematogenous infection.

It has been observed repeatedly that acute attacks of the above diseases often follow exacerbations of infection in sinuses, teeth, or tonsils, hence these sources should always be looked for as a routine procedure and, when found, infection about teeth eliminated first. Ulrich has reported that 68% of all artificially devitalized teeth have apical abscesses.

The view of many obstetricians is that foci of infection predispose to eclampsia, abortion and ill health of the foetus. It is borne out by Rosenow's experiments and A. H. Curtis,⁴ who reports, that streptococci associated with spontaneous abortion in women tend to lodge in uteri of pregnant rabbits and produce abortion. This view was also advanced by Samuel

Downing⁵ who says that focal infection is a probable cause of breast abscesses, pyelitis, abortion, nephritis and eclampsia in pregnant women. All pregnant women at the Mayo Clinic who present signs of dental or oral sepsis are subjected to full mouth roentgenograms.

The kidneys are frequently diseased as a result of focal infection. W. J. Mayo⁶ says acute nephritis is often due to toxin, not bacteria, from foci in teeth, tonsils, gall-bladder, duodenal ulcer, etc., and especially is this true in those cases of acute nephritis going on to chronicity. He does not believe though that true Bright's is due to this cause.

The hematogenous kidney infections, must be differentiated from the above. Here we have the result of a bacteriemia, not toxins with the possible sequelae of infarcts, perinephritic abscesses, pyonephrosis, calculi, pyelitis, etc. The source of infection here is from distant foci.

C. H. Mayo,⁷ speaking of causation of kidney stones, says the infection theory seems the only tenable one to him, but he contends the development of stones requires two factors of infection, i. e., two types of bacteria, one producing a hematogenous infection, and one only coming from some local focus, perhaps only momentarily inhabiting the blood stream; these factors in the presence of mucoid material produce stones, which is analogous to the production of stone in infected gall-bladder, tonsils, etc.

Bumpus and Meisser⁸ say that pyelonephritis may often be due to focal infections, harboring streptococci which have a selective affinity for the urinary tract.

We must also bear in mind that pyelitis once developed may itself act as a focus, because India ink injected into the pelvis of a dog's kidney can be recovered in remote tissue, so why not the absorption of bacteria and bacterial toxin?

Eradication of foci should play a big role in the prevention of cardiac diseases. It has been estimated that 180,000 people died of heart disease in the United States last year, and that 200,000 school children have heart lesions today. It is my impression that about 2% of the children admitted to the Manhattan Eye, Ear and Throat Hospital in New York for tonsillectomy, and examined by me, had heart lesions.

Robert Halsey, of New York, says that organic heart disease in children aged five to nine years causes more deaths than any of the so-called children's diseases except diphtheria; it also has a higher death rate among children than pulmonary tuberculosis.

Maurice Lewison⁹ says that, in heart block and paroxysmal tachycardia, foci of infection should be carefully looked for, and that the importance of infection as a factor in cardiac failure is too frequently overlooked, and the generally accepted theory of back pressure and cardiac strain should be abandoned in most cases.

As for the thyroid in its relation to focal infection, Stuart McGuire¹⁰ said recently: "While we do not know much about the etiology of exophthalmic goiter, it is a fact that the condition follows frequently some acute disease, and is maintained by a focus of infection. Before beginning treatment of any case the teeth and tonsils, and other possible sources of poison should be determined, and eradicated, if found." He cites one case of severe thyroid toxemia which was completely cured by the extraction of four abscessed teeth, along with supportive treatment.

Crile says that in general 50% of goiters are apparently arrested after removal of any infection, whether it be tonsils, teeth, sinuses, etc., and, in those cases where symptoms persist after operation, it is due to leaving too much thyroid or failure to remove the focus.

Frequently goiter patients date their onset to attacks of tonsillitis and remark that their condition is aggravated during such attacks. I have seen two cases in which acute thyroiditis followed acute tonsillitis.

There is less evidence in the literature of the intestine acting as a focus than teeth, tonsils and sinuses, but we all know it is a frequent source and, when we consider that it contains approximately six hundred times as much lymphoid tissue as the pharynx, one reason is apparent, and also since definite strains of streptococci may be recovered from sinuses or tonsils and also from the stool, it shows us that these masses can become infected.

There are also many cases in which the less frequent sites mentioned at the beginning of this paper have been a cause, but we will not consider them at this time.

I have chosen for this paper the most frequent sites for focal infection, and some of

the least considered, but most serious of diseases produced by them, because we are all more or less familiar with the well worked out relation to arthritis, acute rheumatic fever, iritis, etc.

It is interesting to note that I was able to pick out in the literature some fifty odd diseases whose etiology was focal infection. Among them were endocarditis, myocarditis, bursitis, erythema nodosum, purpura hemorrhagica, glaucoma and other various forms of ocular disease, neuritis, herpes zoster, chorea, arthritis deformans, osteomyelitis, cyclic vomiting of childhood, and neuritis of the highly specialized nerves as optic, auditory and olfactory.

We now see that there are many sites in the body where focal infections are possible, and many and varied diseases as the result and, if one bears this subject in mind continually when examining patients, he will be frequently rewarded in curing or improving the condition of his patient, and in preventing serious diseases, which otherwise might occur.

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118 26th Street.

SOME QUESTIONS AS TO LIFE.

By CHARLES MINOR BLACKFORD, M. D., Staunton, Virginia.

There is nothing of more profound interest to living beings than is the study of life itself, and nothing can be of greater importance than a complete understanding of it, should such an understanding be attained. When the most philosophic of the English poets wrote that

"The proper study of mankind is man," and thereby repeated the dictum of the Latin poet who said: "I am a man, and I consider nothing human alien to me,"* their sayings merely confined to humanity the statement to which we of later days have given wider scope by saying that we are living beings and we consider nothing pertaining to life as unworthy of study. Of recent years much research has been given to life itself—not to what was formerly called natural history; the forms and habits of animals and plants,—but to the nature of life, the characteristics of that force which divides living from non-living bodies; which enables living bodies to perform functions which non-living bodies cannot perform, and which, so long as it persists, gives to the tissues of living organisms the power of maintaining and renewing the chemical combinations of which they consist and which fall apart when life ceases. Like Sidney Smith's celebrated definition of an archdeacon as "A person who performs archidiaconal functions." we can only define life by stating what living beings do. Life has no antithesis: there is no word of opposite meaning. Probably the majority of people would think of "Death" as the antithesis of "Life," but death is only the cessation of life: its last step, so to speak. Non-living things are often spoken of as dead, as in the familiar expression—"As dead as a doornail," but this use is merely a poetic license and the word "dead" cannot in strictness be applied to anything which has never lived. In fact, our ideas as to what constitutes the state which we call "living" are so vague that they cannot be clearly expressed.

There are certain phenomena usually connected with life, which, to the ordinary untrained observer, seem to differentiate living beings from lifeless ones beyond the possibility of mistake. Before looking into these, it will be well to remember that the microscope has greatly extended our knowledge of living beings and has shown us organisms which are unquestionably alive, but of whose existence the scientists of seventy-five years ago were totally ignorant. The functions and life histories of these tiny bits of matter form as important a part of the great drama of life as do those of the most highly organized animals and plants, and from the study of them we have learned most of the modern science of biology.

On the other hand, the application of new methods of research has shown phenomena which have greatly complicated the distinction between living and non-living matter which once seemed so clear and sharp.

One of the most obvious manifestations of life is the ability of a living being to move spontaneously. In a sea, lake or stream there are certain things such as logs, fallen leaves and the like, which are only moved by winds, currents or other external agencies. These bodies make up what is called the "plankton," whereas there are other things such as fishes and aquatic animals, which move by their own forces and are not included in the plankton. In general, it may be said that the plankton is non-living, but this is not scientifically true, for fisheggs and the larvae of many aquatic animals form part of the plankton because they are incapable of spontaneous movement, but they are none the less living. Although all living bodies may not be able to move themselves as a whole, it was long thought that any body which can spontaneously move must be living. If we put a drop of pond water under the microscope, we see numberless particles moving with considerable speed in the water and we say that it swarms with life. We may see a small mass of slime throwing out projections in various directions and slowly drawing itself across the microscopic field. We recognize this organism as a living being and we give it the name of *Amoeba limax*, the slug amoeba, and we say that it is alive because it moves. Physicists* have shown, however, that movements of precisely the same character are carried on by substances which cannot, by any stretch of imagination, be regarded as living; movements in oil drops, in organic and inorganic mixtures and even in globules of mercury, which no means at our command can distinguish from amoeboid movements made by protozoa or white blood cells. These movements result from purely physical and chemical reactions which cause changes in the surface tension of the liquids under examination. Leo Loeb† demonstrated that in the blood cells of the horse-shoe crab (*Limulus*), amoeboid movement depends on stimulation caused by

*G. Quincke. *Annal. d. Physik. und Chem.* 1870 and 1888. Quoted by E. A. Schaeffer, British Association for the Advancement of Science, Dundee Meeting, 1912.

†Loeb, Leo, M. D., Amoeboid Movement, Tissue Formation and Consistency of Protoplasm. *Science*; March 18, 1921, page 261.

*Homo sum; humani nihil a me alienum puto.

changes in the consistency of the protoplasm; a phase of liquefaction being followed by one of hardening. On these phases also depend the agglutinability of the blood cells and the formation of tissues from isolated cells, and they play a part in thrombosis and inflammation. By later experiments he showed that the character of the amoeboid movements may be varied greatly by changes in the consistency of the protoplasm produced by taking up fluid from the surrounding medium, and that the phenomena of wound healing may be imitated by graded differences in the osmotic pressure in the medium surrounding the cells. In brief, these functions which have been regarded as characteristic of life or "vital force," are merely manifestations of physical reactions. As Dastre puts it: "Vital spontaneity, so readily accepted by persons ignorant of biology, is disproved by the whole history of science. Every vital manifestation is a response to a stimulus, a provoked phenomenon. It is unnecessary to say this is also the case with brute bodies, since that is precisely the foundation of the great principle of the inertia of matter. It is plain that it is also as applicable to living as to inanimate matter."†

All of us have seen the swarms of gnats or other small bodies which gather around a light and keep up a ceaseless dance in the illuminated space. This movement is regarded as a proof that these tiny beings are alive, but, if we observe the microscopic grains of dust suspended in almost any liquid or fine globules of oil suspended in water, we see what is a much similar movement. This spectacle has struck all observers since the invention of the simple microscope, but in 1827 the English physicist Brown gave this movement much study, and since that time it has been known as the Brownian movement. It is an oscillation, a swinging back and forth of the particles and is not attended by any great change in locality. The larger particles move quite slowly while the smaller ones are very active, and those near the limit of microscopic visibility move so swiftly across the field that they can rarely be caught in flight. The character of the liquid medium seems to have no effect on the movement except that it is more lively in alcohol or ether, which are mobile liquids, than in glycerine or sulphuric acid, which are more viscid.

It is seen in the tiny bubbles of gas enclosed in the drops of water sometimes found in quartz crystals which were formed in the Plutonian age of the world; it occurs in strongly acid or alkaline liquids which have been heated under pressure to temperatures at which life would be impossible. In other words, it is not a vital phenomenon, and at our present stage of knowledge, its cause is unknown. It is, therefore, evident that motion may go on in lifeless bodies, and that movement cannot be accepted as characteristic of life.

The next great group of phenomena which was long associated exclusively with life, is that connected with growth and reproduction. For a body to begin its existence as a tiny bit of matter; to take in nourishment from a suitable pabulum; to grow to an approximately fixed size and into a fixed form and then to produce other bodies like it, has been held to be a characteristic function of a living organism. That living beings and living beings only are capable of reproducing their kind has been held as a fundamental truth, especially in view of the researches into bacteriology during the past fifty years, and the classic experiments of Koch, Pasteur, Ehrlich and the other founders of modern bacteriology and pathology, seemed to have settled the question beyond a peradventure. "Omne vivum ex vivo" became a commonplace expression in biology, but as we have learned more and more of the properties of matter, the absolute truth of this saying has become open to question. Were we to put it "Every cell springs from a previous cell," we would approach a truth, but it must be borne in mind that a cell is quite a highly organized being. It consists of a nucleus which our staining methods show to be extremely complex in structure, and of a mass of protoplasm which is far more complex than was formerly believed. In other words, although we may accept the statement that cells are not spontaneously generated, we must accept it just as we accept the fact that cats are not spontaneously generated, and remember that between the lowest living matter and an amoeba or a bacterium there lies almost as long a line of evolution as there is between an amoeba and a cat.

With living beings it is found that they begin as very small bodies which are often radically different in form and appearance from the parent. As development proceeds,

†Dastre, *La Vie et la Mort*. English translation by W. J. Greenstreet, 1911, page 280.

the embryo becomes larger and resembles the parent more closely, and this growth continues until approximately a certain size is reached. The individual then ceases to grow in any marked degree, but gives rise to another organism which, in turn, repeats the same process of development. In general, the germ cell requires a stimulus of some sort to urge it into action, and this stimulus is commonly supplied by union with a germ cell from another individual. This is not essential however. The experiments of Jacques Loeb on the chemical fertilization of the eggs of the sea urchin and the observations of Leo Loeb* on the parthenogenic development of eggs in the ovary of the guinea pig, where in some instances the ova developed in the Graafian follicle up to the formation of the placenta, indicate that some stimulus, other than that supplied by the spermatozoon, may suffice to start development. As the French say: "Ce n'est que le premier pas qui coute" and, if a purely chemical or physical stimulus can originate the process of development, there is no reason why it should not carry it on to its conclusion without the aid of any special vital force.

Those who held or still hold that there is a mysterious "Vital Force" which produces these activities in living bodies find it difficult to explain similar activities in bodies which are unmistakable non-living. An inorganic crystal begins from a tiny nucleus, grows in size and into a shape so definite that it may be taken as a test of the composition of the crystal and, having reached a more or less definite size, will cease to enlarge but will originate new similar crystals. Furthermore, if during the formation of the crystal a facet be scratched or an angle broken, growth will cease and the damage be repaired; a process which is suggestive of the healing of a wound. If a mixed pabulum be prepared; if, for instance, a mixed solution of alum and copper sulphate be allowed to crystallize, the two salts will separate out in the process, and chemists use repeated crystallizations as a means of freeing crystalloids from impurities. In brief, a non-living, inorganic salt appears to develop a body which is true to type, which is able to repair injuries inflicted on it, which will increase to an approximately typical size and will then produce offspring as perfectly as does an animal

or plant. It therefore appears that growth and reproduction are not absolutely characteristic of life nor are they dependent on other than the same laws which control inorganic matter.

I cannot go into the work which Ledue and others since his day have done with inorganic colloids which, placed in an appropriate medium, show striking similarities to the growth and fission of living organisms. Even the very complex process of karyokinesis which is preparatory to fission in a cell, can be imitated with a solution of a simple inorganic salt, such as sodium chloride in which particles of lampblack have been suspended, for the carbon particles arrange themselves under the influence of the electrolytes in a manner which a skilled biologist cannot distinguish from those adopted by the particles of chromatin in a dividing nucleus. I would like to mention the problems of latent life in which animals and plants lie until the conditions favorable to their resuscitation come about. I would like to say something in regard to the organic products which were long thought to be elaborated only through the agency of "vital energy"; an idea which fell when Graebe and Liebermann, in 1868, made alizarin, the coloring matter of madder, from its elements and laid the foundation for the wonderful chemical industries of today. It is true that there are many organic compounds which have not yet been made synthetically, but this does not mean that they may not be produced as our knowledge advances. As Huxley put it: "There are many things which are unknown; whether there be anything which is unknowable can be settled only by the future," and one of these is the full answer to the question "What is Life?"

THE INCIDENCE OF HEART DISEASE IN THE NEGRO RACE.

By W. S. WOODY, B. S., M. D., Hopewell, Va.

In approaching the subject of heart disease one does so with fear and trembling. So much has been and is being written on the subject that one hesitates to further tax an already overburdened literature. However, it is not my intention to discuss either the diagnosis or treatment of its various forms, nor to mention the newer instruments of precision which have lately added so much to our armamentarium in attacking this malady. I prefer rather to approach it from the standpoint of the im-

*Leo Loeb, M. D. The Parthenogenic Development of Eggs in the Ovary of the Guinea Pig. *Science*, July 13, 1923. Page 35.

portance of its incidence, especially as to its occurrence in the negro race.

The problem of heart disease is certainly one of the most important which the medical man of today must face. A few years ago Osborne wrote, "Of late years the disturbances of the heart are beginning to assume a more prominent place in the list of causes of death, so that perhaps only tuberculosis and kidney disturbances are more prominent." I think that, if he were allowed to modify this statement in the light of more recent years of experience, he would admit that even these diseases are falling into the background in their order of occurrence.

Life insurance companies are reporting and stressing the fact that there is a constantly increasing death rate from cardiac conditions. It has become a problem which hovers over humanity with a constantly increasing dread; and is of great importance to us—not only from a standpoint of mortality rate, but as a serious economic problem—in the vast army of those who each year are incapacitated for work from this cause.

With typhoid fever, diphtheria, tuberculosis and smallpox, we have learned to cope in a way of which we are justly proud. With other infectious conditions we hope to accomplish that which will in time relegate them to the limbo of the past. "Safety first" campaigns and the instruction of workers in nearly all industrial enterprises are accomplishing wonders in the reduction of morbidity and mortality rate from accidental causes. Much has been and is being accomplished in the prevention and treatment of nutritional and metabolic disturbances. Surgery is forging ahead at a marvelous rate, while the mortality rate from heart disease is on the increase.

In my own practice the alarming occurrence of cardiac diseases has struck me as of very significant relative frequency in the negro race. In fact, the frequency with which I find it, especially in the negro man of forty or over, makes it very hard for me at times to prevent myself from jumping to conclusions. Very often in obtaining a history, HEART flashes across my mind so large that it is with a distinct effort put out of my consciousness while a further history and examination are obtained in an effort to find other possible causes of their symptoms.

A consideration of statistics concerning the

mortality rate from cardiac conditions in various states is not amiss, and will be found to be rather impressive. In all states within the registration district from the years 1913 to 1921 there was an increase of from 167.8 to 173.2 per 100,000 population, in the mortality rate of heart disease. Topographically, there is a remarkable incidence of occurrence in the northeastern states as compared with the southeastern. For instance, in the states of Maine, Massachusetts, New Hampshire, New York, Vermont, Rhode Island and New Jersey for the year of 1921, there was an average death rate from cardiac conditions of 209.5 per 100,000 population, as compared with a rate of 108.9 in the seven southern and southeastern states of Virginia, North Carolina, South Carolina, Tennessee, Mississippi, Kentucky and Louisiana—a proportion of nearly two to one. An individual comparison of these states for the year 1921 gives the following figures: Maine, 222.3; Massachusetts, 206.7; New Hampshire, 211.9; New York, 211.3; Vermont, 255.9; Rhode Island, 179.5; New Jersey, 179.; while the southern states for the same year showed, Virginia, 137.3; North Carolina, 109.2; South Carolina, 105.; Tennessee, 94.6; Louisiana, 122.1; Kentucky, 97.4, and Mississippi, 97.

In the southern states a comparison of the death rate between the white and negro race shows a marked preponderance toward the colored; a total average for the seven named southern states being for the year 1921, whites 96.7, while the colored rate was 144.9—or about three negroes to every two whites.

An individual comparison in these states between these races follows: Virginia, white 122.5; colored 172.6; North Carolina, white 99.7; colored 131.2; South Carolina, white 100.1; colored 109.8; Tennessee, white 81.2; colored 151.6; Louisiana, white 105.7; colored 148.5; Kentucky, white 87.9; colored 187.9; Mississippi, white 80.; colored 112.5.

Of all states, Vermont leads with a death rate from cardiac conditions for the year 1921, of 255.9, and an average rate for the years of 1912 to 1921 of 243.6. Next highest comes, for the same ten years, New Hampshire, with an average of 226.8, and the neighboring state of Massachusetts, with an average of 213.8. Montana, off in a district by itself, has the lowest rate for the year 1921, being 90.9, and an average for the last ten years of 98.7, while Kentucky is next lowest with a rate for 1921 of

97.4 and an average rate for last ten years of 103.9.

A comparison of cities with rural districts shows a higher death rate in the cities. For 1921 the average death rate in cities from heart disease was 174.3, while in rural districts it was 141.1. For the last ten years the rate in cities was 178.2, while for a similar period in rural districts it was 145.3. In cities there was an increase from the years 1913 to 1921, of from 171.2 to 174.3, while there was in rural districts a decrease of from 145.8 to 141.1.

Among the states showing the largest increase in death rate from heart disease was Florida, which, from 1919 to 1921, increased from 95.5 to 119.1, for whites and from 102.7 to 119. for colored—a total for both races of from 98. to 119.1, or an increase of 21.1 for 100,000 population in three years. In Maryland, for the years 1913 to 1921, there was an increase from 141.6 to 172.1 for whites, and from 224.7 to 247.2 for colored—a total for both races from 156.2 to 184.7, or an increase of 28.5 in nine years. In Mississippi, for the years 1919 to 1921, there was an increase from 63.3 to 80. for whites, and from 86.9 to 112.5 for colored—a total for both races from 75.7 to 97, or an increase of 21.3 in three years. South Carolina, for the years 1916 to 1921, showed an increase for whites from 84.7 to 100.1, and for colored from 101.2 to 109.8—a total for both from 93.4 to 105, or an increase of 11.6 in six years. In Virginia, for the years 1913 to 1921, the increase for whites was from 104.4 to 122.5, and for colored, from 160.3 to 172.6—a total from 122.1 to 137.3, or an increase of 15.2 in nine years. In Vermont the increase for the years 1913 to 1921, was 231.2 to 255.9, or 24.7 in nine years, while New York, for a similar period, showed an increase from 177.6 to 211.3, or 33.7 in nine years. Some of these figures are rather startling and especially as it applies to the negro race; some states, as for instance Kentucky, showed a preponderance of over two to one as compared to whites.

Not only is this true in the negro adult, but applies to negro children as well. Recently, in a routine examination of negro school children, including both sexes and ranging in age from nine to fourteen years, I found as high as twenty per cent of them subject to unsuspected compensated heart lesions, a majority of them being aortic lesions. The etiological

factors in this series were, so far as could be determined, syphilis, diseased tonsils and in a few instances a history of rheumatic fever. The findings in this series of cases is probably out of proportion to what would be found as an average in a larger group. However, the number was sufficient to bring the relative incidence of cardiac conditions in the negro forcibly to mind.

Next in importance to its frequency of occurrence, to my mind, is that the proportion of aortic lesions in the negro far surpasses that in the white. In the negro man of forty or over aortic regurgitation is probably as often met with as all other valvular lesions combined. Aortic stenosis and mitral valve lesions occur about in the same proportion to each other as in whites but, as stated, much more frequently as a whole. Myocardial weakness is, of course, frequently seen in connection with valve lesions and arteriosclerosis. Pulmonary and tricuspid lesions are relatively rare, while purely functional cardiac disturbances are, as a rule, much more rare in the phlegmatic negro than in the more high-strung white.

With these facts before us, the question of why the negro is so much more often the victim of heart disease naturally presents itself. This is probably a question of some individual speculation and variable opinion. A brief survey of some of the more common factors concerned in the production of cardiac conditions and especially those which commonly produce aortic lesions, will probably go a long way in explaining its incidence.

Acute Infectious Conditions—Very often the negro pays little attention to the common infectious diseases in children unless they become severe enough to threaten life. Even should the services of a physician be secured, the parents are prone to disregard advice as to the importance of a prolonged convalescence. As a rule, they consider that as soon as the child himself feels able to leave the bed all danger is over, either disregarding or knowing nothing of the disastrous effect that such a procedure may have on a tired toxic heart. It is very characteristic for them to live today and let tomorrow take care of itself.

Focal Infections, especially diseased tonsils, come in for little consideration as a whole by the negro. Very often the sore throat is treated by external applications or even left to take

care of itself; disregarding the after-effects that may arise, the focus is allowed to remain as a constant source of danger to the development of cardiac lesions.

As for *Veneral Disease*, indiscriminate sexual indulgence and lack of regard for personal cleanliness and prophylaxis, together with a lack of knowledge of the seriousness of both the condition itself and its possible consequences, leads to a relatively much higher rate of occurrence of both syphilis and gonorrhea in the negro. Subsequent to its development, their disregard for proper treatment often leaves either a focal infection or a systemic condition—in either case a serious menace to the development of cardiac lesions.

As a rule, the negro is subjected to much harder manual labor than the average white. The constantly increased arterial pressure which results from adrenal stimulation by the increased carbon dioxide in the blood stream tends toward the development of arteriosclerosis and its train of cardiac complications, and often results in the aortic lesions which are so commonly encountered in the middle aged or older negro man.

Thayer found two-thirds of all cases of arteriosclerosis due to over-work, while Reisman believes syphilis to be the more important cause where there is no renal disease. There can be little doubt that the great causes of this high rate in the negro are syphilis and heavy manual labor, and this would explain the relatively higher rate of aortic disease, both being important factors in the production of aortic lesions.

What shall we do to influence this important condition? Shall we fold our hands and be satisfied to do the best we can with our feeble drugs when the victim of decompensated heart lesions at last presents himself for treatment? With how hopeless an outlook must we view our efforts in this line as to their ultimate outcome? No one knows better our inability to replace a diseased valve or to restore to normal functional capacity a diseased heart muscle.

What then can we do? We must realize that, in order to influence the mortality rate from this condition, our efforts must above all things be along the lines of prevention and to this end we must bend our energies: Campaigns against venereal diseases; a more careful search for and more emphatic instructions

concerning the importance of the eradication of focal infections; the insistence of a prolonged convalescence in infectious diseases, especially a prolonged rest where on first sitting up the heart shows some form of arrhythmia. The modification of cough and support of the heart in all severe respiratory conditions, where the added strain of severe coughing, together with the toxin of the disease strain the heart muscle to the breaking point, are very important considerations in the treatment of these conditions. The warning against the abuse of alcohol is to be mentioned, although this is not so important a factor in the production of heart disease as formerly.

In short, we must realize and bring the public to realize with us that this great subject must be approached from the standpoint of prevention.

New Stewart Building.

PRESENTATION OF THE BRONZE BUST OF DR. RAWLEY WHITE MARTIN TO CONFEDERATE BATTLE ABBEY.

By STUART McGUIRE, M. D., Richmond, Va.

I am keenly appreciative of the privilege that has been accorded me in allowing me, as a representative of the Rawley W. Martin Memorial Association, to make the presentation of his bust to the Battle Abbey.

Dr. Martin was born the year my father was born. They both served in the Confederate Army. They were close personal friends and were frequently associated in professional practice and in matters of public welfare. Dr. Martin was a constant visitor at our home, and from my earliest boyhood I was taught to respect and admire him and to hold him as a model to be lived up to. In later years I had the good fortune to see him often at the bed-side of patients, at the sessions of medical societies and at the meetings of the State Board of Health. I learned to know him and to love him, and I was as intimate with him as it was possible for two men of our respective ages to be; hence the selection of me for this most pleasant task may not be altogether without justification.

In the time allowed me it is impossible to tell the story of his life, which was filled with activities in many and varied fields of work, or to describe the qualities of mind and heart which so endeared him to all who knew him.

I must therefore content myself with a bare sketch of the essential facts of his history in order to have opportunity to emphasize the military side of his career.

Dr. Martin was born in 1835. He received his academic education at the University of Virginia and graduated in medicine from the University of New York in 1858. He located in Chatham, Va., and began the practice of his profession in 1860. At the outbreak of the War Between the States he was offered a commission as a medical officer, but declined it and entered the army as a private. His courage and efficiency soon became recognized and he received rapid advancement. He commanded a company at Malvern Hill, a regiment at Gettysburg, and at the time of the surrender at Appomattox papers were in transit promoting him to the rank of Brigadier General.

At the close of the war, Dr. Martin returned to Chatham and resumed the practice of medicine. In 1867 he married Miss Ellen Johnson of Pittsylvania County. In 1895 he moved from Chatham to Lynchburg where he lived until his death in 1912.

Dr. Martin always spoke of himself as a country doctor but, while he embodied all the virtues of that character so dear to literature, there was nothing provincial in his point of view or scope of work. To his patients he was not only a beloved physician, but a trusted counselor as well. To his community he was an alert, broad-minded citizen whose views had weight in matters of Church and State. To his profession he was an example of industry, ability, learning and high ethical standards. To his family and friends he was a modest, lovable, patient Christian gentleman whose heart knew no evil and whose soul feared no danger.

Dr. Martin's activities won him many public positions of honor. He was a member of the Board of Visitors of the Virginia Military Institute and of the University of Virginia. He was one of the founders and for many years the President of the Medical Examining Board of Virginia. He was at the time of his death President of the State Board of Health, and he was largely responsible for the establishment of the State Tuberculosis Sanatoria which have done such useful work. He was active in many medical organizations and was unanimously elected President of the Medical So-

ciety of Virginia, the highest honor in the power of the medical profession of the State to bestow.

It is Dr. Martin's war record that must be stressed on this occasion. It is a crowded narrative of splendid service. He was at Big Bethel, Seven Pines, the Seven Days' Campaign, Second Manassas, Sharpsburg, Harpers Ferry, Fredericksburg, the Suffolk Campaign and Gettysburg. Tributes to his gallantry in the performance of duty are unstinted, and in a number of cases are embodied in official reports.

General Clement A. Evans in his Confederate Military History relates this incident: "Fletcher Harwood, color-bearer of Company K, was cut down by a shell at Malvern Hill, and as recorded in the War Records, instantly Captain Martin seized the flag and with words of encouragement called on all to follow. The noble, manly conduct of Captain Martin was such as to challenge the admiration of all." Colonel Tomlin's report of the final charge that evening contains the following: "The different members in our regiment were formed into one company under command of Captain Martin whose gallantry was not exceeded by anyone in that memorable battle." The regiment lost 30 killed and wounded out of 128 in action.

The charge of Pickett's Division at Gettysburg and the part played by Dr. Martin is described as follows in an article written after the war by the Rev. James E. Poindexter of Maryland who was Captain of one of the Companies of the 53rd Regiment and personally participated in the assault:

"During the cannonade which preceded the charge, Colonel William R. Aylett, commanding the 53rd was wounded and retired from the field. The command of the Regiment then devolved on Colonel Martin, and as the 53rd was the 'batallion of direction' of Armistead's Brigade, he was thus thrown during the whole subsequent advance in the very closest contact with that heroic chief. As we neared the enemy, General Armistead, at the request of General Kemper, gave the order 'double quick' and the 53rd, led by Lt. Col. Martin, rushed forward with other regiments of the Brigade, through the storm of shot, and gained the stone fence behind which the Federals had lain. Here the men halted, and then it was that Colonel Martin displayed, in full view of

friends and foes, that brilliant courage which marked him out as 'the bravest of the brave.' He mounted the fence and calling aloud 'forward with the colors' leaped down on the side nearest the enemy and strove by voice and gesture to urge on his men. He was the first man in Pickett's Division to scale that fence. And now the intrepid Armistead, his hat on the point of his sword, followed Colonel Martin over the fence, and called on the gallant band that rushed over after him to make one supreme effort to carry the heights. 'Give them,' he cried, 'the cold steel.' But alas their splendid valor was displayed in vain. The Federals poured in a withering volley and Colonel Martin, his thigh bone dreadfully shattered, fell unconscious, not four feet from the lamented Armistead.

"It may give some idea of the terrible loss sustained by Armistead's Brigade when I mention that after the few who survived the charge returned to the point from which they started, Lieutenant Bilharz took command of the 53rd, and Major Joe Cabell of the 38th Regiment, took charge of the Brigade.

"In view of these facts, and they are facts for which many now living in Pittsylvania County, Virginia, are ready to vouch—I respectfully submit that if Pickett's Division deserves the praise which its behavior at Gettysburg has won alike from friend and foe, then the name of Rawley W. Martin is worthy of imperishable honor. I would not detract from the fame of Armistead and Pickett. Their noble deeds have passed into history. Their names can never be forgotten. But the man who outstripped Armistead himself in the path of glory, the man who in the face of fearful odds dared to advance beyond all others, the man who climbed with unfaltering step that rocky barrier and led the dauntless band that followed into the very jaws of death need never blush to see his name coupled with theirs. The county which gave him birth, the state for which he shed his blood, might well glory in his valor. But his modesty is equal to his courage, and so it is that his matchless valor has not received that public recognition which it richly merits."

I am happy that this complaint is no longer true. I am glad that a permanent memorial will now be placed in such a beautiful and historic building. I am proud as the spokesman of the Rawley W. Martin Memorial As-

sociation to present to the Battle Abbey a bronze bust which bears the following inscription:

RAWLEY WHITE MARTIN, M. D.
LIEUTENANT COLONEL 53RD VIRGINIA INFANTRY
C. S. A.

Born 1835; Died 1912

"He commanded his Regiment forming Armistead Battalion of Direction in Pickett's Charge at Gettysburg on Cemetery Ridge. A tribute from his friends in commemoration of his devotion as a soldier, physician and citizen to the highest ideals of duty and service."

**PRESENTATION OF THE PORTRAIT
BUST OF DR. HUNTER HOLMES
McGUIRE TO CONFEDERATE
BATTLE ABBEY.**

By DON P. HALSEY, LL. D., Lynchburg, Va.

MR. CHAIRMAN, DR. HODGES, LADIES AND GENTLEMEN: In the sixty years that have rolled around since the great War between the States, the fact has become clearer and more distinct to every thoughtful student of history that the most valiant, the most heroic, the most efficient, the most brilliantly led, and the most wonderful army in all respects that ever marched and fought upon this planet was the Army of the Northern Virginia. Its infantry, its cavalry, its artillery were alike matchless and incomparable, and in the vitally important department of its staff it was also thoroughly well equipped and served. In its medical and surgical staff, especially, was it fortunate in the character of the men who composed it. Handicapped as they were by lack of supplies, they nevertheless fulfilled through their ability and fidelity the requirements of their arduous duties in a manner beyond all praise. At the head of the Medical Department of Stonewall Jackson's army, and after Jackson's death as the medical director of the Second Army Corps until the end of the war, was Dr. Hunter Holmes McGuire, a man whose great figure now looms up in history in even nobler and more commanding outlines than during the days of his masterly achievements. To all Virginians, and to all men of his profession throughout the world, his name is familiar as that of a brilliant physician, a surgeon of surpassing genius and a teacher of preeminent power. It is not, however, as a great exemplar of the highest

achievements of a noble profession that we wish to honor him here today. That would anyhow be a work of supererogation, for already have his praises in his chosen life work been sounded by eloquent tongues, and recorded by brilliant pens, and his niche is secure and high in the temple of fame. It is to Hunter McGuire the patriot that we now desire to give homage. The great surgeon, the eminent teacher, the president of all the highest associations of medical and surgical scientists, the founder of a great medical college and of a great hospital, has already received the highest honors that can be bestowed upon one to whom such honors are possible. Today we place him as a soldier of the Southern Confederacy among his comrades of the days of yore, and wreath upon his brow the immortelles that belong to those who for four long years on glory flooded fields struggled to maintain the empire of principle in the earth, and who with honor untarnished and consciences inviolate fought desperately for the cause they knew to be right. If those bronze lips could speak I doubt not that they would say that Hunter McGuire would not exchange the honor of having fought under the starry and stainless flag of the Confederacy for all the other honors that were heaped upon him, for all the gold piled up in treasury vaults, or for the costliest diadem that ever sparkled in a monarch's crown.

To you then, Dr. Hodges, as the representative of R. E. Lee Camp No. 1, on this occasion, I have the honor to commit, on behalf of his worthy and distinguished son, this portrait bust in bronze of Hunter Holmes McGuire, Doctor of Medicine, Doctor of Laws, a soldier of the Confederacy who followed and fought with Stonewall Jackson, and whose name will forever be associated with his among the tenderest, the most precious and the most glorious memories of the "Storm cradled nation that fell."

Analyses, Selections, Etc.

The Relationship of the Ion Content of the Cell to Symptoms of Disease with Special Reference to Calcium and Its Therapeutic Application.

F. M. Pottenger, Monrovia, Calif., discusses the physio-chemical changes of the cell nor-

mally and pathologically. He believes the "action of the cell may be carried on independently of the correlating and integrating forces of the two great systems of body regulators, the nerves and the incretions; but full and purposeful activity requires a co-ordination of all regulatory forces," but the nerve or incretion action is also dependent on the chemical and physical state of the cell. If the physio-chemical equilibrium of the cell is disturbed beyond certain normal limits then symptoms of disease appear. He believes intake of the fundamental inorganic salts as important in cell metabolism as the intake of proteins, carbohydrates and fats.

Tables are given showing the cellular, liquid and chemical content of the blood, and he mentions that certain salts are antagonistic to each other when present in certain organs.

The author believes that besides nervous symptoms and glands of internal secretion other forces yet unknown to science control the metabolic process of the cell.

The calcium salts seem to be bound up with the sympathetic nervous system and act very much in the manner of suprarenin. He bases this on experimental work done on the heart, intestines and other organs under sympathetic control. It is suggested that the thyroid, pituitary and parathyroids have to do with calcium retention in the body, while the gonad system has the opposite effect.

Clinically, calcium strengthens the systole of the heart, relaxes the musculature and reduces the secretions of the respiratory system through its effect on the sympathetic and opposes the parasympathetic action.

With calcium or suprarenin the sympathetic nervous system can be stimulated to such a degree as to overbalance the parasympathetic nerves. On the other hand atropine inhibits parasympathetic action while pilocarpin stimulates it.

The author further believes that a great many more visceral diseases are attributable to the vegetative nervous system than have been heretofore generally accepted.

Therapeutically, he suggests the use of calcium or adrenalin, or both, for sympathetic stimulation, or atropine for parasympathetic inhibition in the following: (1) anaphylaxis; (2) serum reactions; (3) urticaria; (4) asthma; (5) hay fever; (6) bronchitis; (7)

affections of the gastro-intestinal tract. The sphincters have the opposite innervation.

He does not suggest this therapeutics as a cure-all but believes it to be of great value in these types of cases. Five c. c. of a five per cent solution of calcium chloride in ampules is used intravenously at intervals of two days to a week. Injections should be made slowly, requiring five to ten minutes. The reaction, if any, consists of warmth, constriction of the throat, or burning in rectum. These pass off in a few minutes. (*Annals of Clinical Medicine*, Nov., 1923, Vol. 2, No. 3).

H. R. MASTERS.

The Truth About Medicine

In addition to the articles enumerated in our letter of December 1st, the following have been accepted:

Cutter Laboratory

Anti-Anthrax Serum for Human Use—Cutter.

Diphtheria Toxin-Antitoxin Mixture—Cutter.

Diphtheria Toxin for the Schick Test—Cutter.

Rabies Vaccine-Pasteur—Cutter.

Tetanus Antitoxin for Human Use (Concentrated)—Cutter.

E. R. Squibb and Sons.

Diphtheria Toxin-Antitoxin, 0.1L+.

Winthrop Chemical Company,

Elixir of Veronal.

NEW AND NON-OFFICIAL REMEDIES.

National Radium Emanator.—A portable appliance for activating water with emanation; the emanation is emitted from a solution of radium chloride, barium chloride and sodium chloride. The appliance is claimed to produce 40 microcuries (150,000 Mache units) of radium emanation to 1,000 c.c. of water daily. The actions, uses and dosage of radium are discussed in New and Non-official Remedies, 1923, p. 255. National Radium Products Co., New York. (Jour. A. M. A., December 8, 1923, p. 1953).

Iodostarine-Roche.—Diiodotariric Acid.—An iodine addition product of tariric acid, derived from the fruit of a species of *Picramnia*. Iodostarine-Roche contains 47.5 per cent. of iodine. It acts in the tissues similarly to inorganic iodides. It is not broken up in the stomach, but a portion of the iodine is split off when it enters the intestine. The undecomposed portion is readily absorbed and, as in the case of other fats, is largely deposited in the tissues where it is slowly split up. The action of iodostarine-Roche is exerted more slowly than that of the inorganic iodides. Iodostarine-Roche is supplied in the form of tablets iodostarine-Roche 0.25 Gm., and as chocolate tablets iodostarine-Roche, containing iodostarine-Roche equivalent to iodine 0.01 Gm. Hoffmann-LaRoche Chemical Works, New York. (Jour. A. M. A., December 15, 1923, p. 2032).

Tetanus antitoxin for human use—Cutter.—Tetanus antitoxin, concentrated (see New and Non-official Remedies, 1923, p. 284), marketed in syringes containing 1,500 and 5,000 units each. Cutter Laboratory, Berkeley, Calif.

Diphtheria toxin-antitoxin mixture—Cutter.—Diphtheria toxin antitoxin mixture (see New and Non-official Remedies, 1923, p. 284), each c.c. representing 3 L+ doses of diphtheria toxin neutralized with sufficient antitoxin to conform to the toxicity requirements of the U. S. Public Health Service. It is marketed in vials containing, respectively, 1 c.c. and 50 c.c., and in syringes containing one immunizing treatment. Cutter Laboratory, Berkeley, Calif.

Anti-anthrax serum for human use—Cutter.—An anti-anthrax serum (see New and Non-official Remedies, 1923, p. 287), marketed in double-ended vials containing 50 c.c. for intravenous injection. Cutter Laboratory, Berkeley, Calif.

Rabies Vaccine-Pasteur—Cutter.—An anti-rabic vaccine (see New and Non-official Remedies, 1923, p. 294), prepared according to the method of the Hygienic Laboratory of the U. S. Public Health Service. The emulsion from the cord is shipped daily and is diluted at the time of injection. The treatment consists of twenty-one daily injections. Cutter Laboratory, Berkeley, Calif.

Diphtheria toxin for the Schick test—Cutter.—A diphtheria immunity test (see New and Non-official Remedies, 1923, p. 323), marketed in packages of two vials, one containing diphtheria toxin and the other physiologic solution of sodium chloride for dilution. Cutter Laboratory, Berkeley, Calif.

Capsules Carbon Tetrachloride (human use)—P. D. and Co.—A brand of carbontetrachloride—N. N. R. It is marketed in capsules containing 20 minims. Parke, Davis and Co., Detroit.

Elixir of Veronal.—Each fluid drachm contains veronal (see New and Non-official Remedies, 1923, p. 63), 2 grains in a menstruum containing alcohol 33.5 per cent. Winthrop Chemical Co., New York.

Diphtheria Toxin-antitoxin Mixture (new formula)—Squibb. Diphtheria toxin-antitoxin mixture (see New and Non-official Remedies, 1923, p. 284), containing in each cubic centimeter 0.1 L+ dose of diphtheria toxin neutralized with the required amount of diphtheria antitoxin. Marketed in packages of three vials, each containing 1 c.c., and in vials containing, respectively, 10 c.c. and 20 c.c. of the mixture. E. R. Squibb and Sons, New York. (Jour. A. M. A., December 23, 1923, p. 2115).

PROPAGANDA FOR REFORM.

Liquid Petrolatum as a Laxative.—Liquid petrolatum is indigestible. It is not absorbed, and, therefore, cannot produce poisoning. In ordinary quantities the administration of liquid petrolatum does not seriously impair the alimentary efficiency. Like all laxatives used in very large quantities, liquid petrolatum may diminish the degree of utilization of food by promoting evacuation before the functions of digestion and absorption can be entirely completed. Liquid petrolatum may produce gastric distress and, therefore, should be taken in a way to interfere least with gastric digestion by administration before bedtime or an hour before meals. In reporting on a proprietary brand of liquid petrolatum widely exploited to the public, the Council on Pharmacy and Chemistry warned that constipation should be treated by dietary and hygienic means, as evacuants are but temporary measures. It further cautioned that liquid petrolatum is medicinal: it modifies greatly the intestinal flora; it acts as a lubricant and emollient; it modifies the absorptive powers of the intestinal mucous membrane; it is capable of influencing the digestion of fats; and, in short, liquid petrolatum is a drug, the indiscriminate and excessive use of which should not be en-

couraged. (Jour. A. M. A., December 1, 1923, p. 1896).

Spahlinger Treatment for Tuberculosis.—Spahlinger is a resident of Geneva, who received medical training but took his degree in law. Later he abandoned law for research work. The Spahlinger treatment makes use of vaccine and serum therapy. The theory from which the treatment is evolved is that the tubercle bacillus emits different toxins under varying conditions of temperature, environment, etc. Many of these are claimed to be isolated as either exotoxins or endotoxins. The vaccines—of which there are said to be about twenty—are used for prophylaxis for treatment of the milder cases of tuberculosis and for the production of the various serums used in the treatment of the more severe cases. It has been reported that the British ministry of health is prepared to encourage the experimental trial of the Spahlinger preparations under scientific supervision. The British Red Cross has appropriated money to enable Spahlinger to work on a larger scale in the production of his preparations. The reports in regard to the efficacy of the preparations which have appeared in British medical journals are conflicting, and the Red Cross organization has made it clear that the products are in the experimental stage. (Jour. A. M. A., December 1, 1923, p. 1896).

Does Heat Injure Vaccines?—It is generally believed that vaccines lose in potency on standing at room temperature. But so far as known, the sterilization of vaccines by heat does not injure the antigenic potency any more than other methods of sterilization, e. g., chemicals. The astounding deduction of a manufacturer of vaccines that heat sterilization, at a definite temperature for a given time must be highly injurious, because vaccines lose in potency on standing for weeks and months at variable room temperature, is simply a pseudoscientific statement intended presumably to bolster up the merits of the advertised wares in the eyes of the more or less thoughtless purchasers. (Jour. A. M. A., December 22, 1923, p. 2135).

Book Announcements

The American Illustrated Medical Dictionary (Dorland). A New and Complete Dictionary of Terms Used in Medicine, Surgery, Dentistry, Pharmacy, Chemistry, Veterinary Science, Nursing, Biology, and kindred Branches; with the Pronunciation, Derivation and Definition. By WM. A. NEWMAN DORLAND, M. D., F. A. C. S., Member of Committee on Nomenclature and Classification of Diseases, of the A. M. A. Twelfth Edition, Revised and Enlarged. Philadelphia and London. W. B. Saunders Company. 1923. Large 8vo of 1,296 pages with 338 illustrations, 141 in colors. Flexible leather, \$7.00 net; thumb index, \$8.00 net.

The present edition measures up well with claims made for this dictionary in the past. This edition has been increased by sixty-nine pages, with a total of over 3,000 new words. Included in these are many new dental words with definitions. This fact adds greatly to the value of the book, owing to the close relation now existing between medicine and dentistry. The elaborate tables given are a most valuable

aid. These too have been revised to the last minute.

It is with interest we note that the publishers secured for special work in this edition the services of Dr. E. C. L. Miller, professor of bacteriology and biochemistry at the Medical College of Virginia. It is stated that he "has checked every chemical word in the book, including all drugs and proprietary medicines, giving special attention to the accuracy of definitions and chemical formulae and to the completeness and inclusiveness of the vocabulary. He has also revised and added to the terminology of Bacteriology, Parasitology, Immunology, Public Health, and Genetics." To our many readers who are familiar with Dr. Miller's painstaking work, this feature alone would commend the dictionary in question.

Medical Record Visiting List or Physicians' Diary.

Revised. New York. William Wood & Company. Medical Publishers. Sixty patients per week record. Price, \$2.00 net.

This is the usual weekly visiting list with space opposite each name for special memoranda. The forepart contains twenty-seven pages of helpful hints in emergencies of various kinds, and will at times be found very useful. The book is bound in flexible leather, and contains a pocket for memoranda slips.

Operative Surgery. Covering The Operative Technique Involved in the Operations of General and Special Surgery. By WARREN STONE BICKHAM, M. D., F. A. C. S., New York. Former Surgeon in Charge of General Surgery, Manhattan State Hospital, New York; Former Visiting Surgeon to Charity and to Touro Hospitals, New Orleans. In six octavo volumes totaling approximately 5,400 pages with 6,378 illustrations mostly original, and separate Desk Index volume. Now ready—VOLUME I containing 850 pages with 921 illustrations, and VOLUME II containing 877 pages with 1,088 illustrations. Philadelphia and London. W. B. Saunders Company. 1924. Cloth. \$10.00 per volume. Sold by subscription only. Index Volume free.

Neurologic Diagnosis. By LOYAL EDWARD DAVIS, M. S., M. D., Ph. D. in Surgery. Assistant Professor of Surgery, Northwestern University Medical School; Fellow of National Research Council. 12mo. 173 pages with 49 illustrations. Philadelphia and London. W. B. Saunders Company. 1923. Cloth, \$2.00 net.

Hernia. Its Anatomy, Etiology, Symptoms, Diagnosis, Differential Diagnosis, Prognosis, and Operative Treatment. By LEIGH F. WATSON, M. D., Associate in Surgery, Rush Medical College, Chicago. 232 original illustrations by W. C. SHEPARD. St. Louis. C. V. Mosby Company. 1924. 8vo. 660 pages. Cloth, \$11.00.

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Editorial

Cholelithiasis.

Last month, editorially, we considered the acute forms of the diseases of the gall-tract. Stress was laid upon the importance of interpreting symptoms, often very meager and indefinite. A brief comment was made upon the nature and cause of these forms. The etiologic relation of primary foci of infection to gall-tract infection was pointed out, illustrating the connection by Rosenow's well-known work which showed the relation of tonsil and teeth infections to gall-tract infection, by the well established relation of typhoid infection to gall-bladder diseases, by the clinical connection or association of pneumococcus infection and gall-tract disease. The probable antecedent existence of these primary infections of the gall-tract, probably in the more subacute and less virulent types, to gall-stone formation, was also suggested as very probable, although the state of the bile elements (especially cholesterin) were in mind as forming a small percentage, without previous inflammation of the gall-tract mucous membrane.

Paramount importance was laid upon the need of recognition of these pathological states in the gall-tract through a keen and interpretative attitude of mind on the part of physicians as they view the passing throng of patients complaining of digestive disturbance—the "dyspeptics."

Now we desire to direct our reader's thought to the following comments on cholelithiasis, or the gall-stone-stage of gall-tract disease. One must be impressed with the probable uselessness of our comments when one reflects upon the vast amount of "literature" in current publications during the last six months. To show how fully the subject has been covered, we might call the reader's attention to a good index of the articles appearing in the world's medical current publications in the latter half of 1923. The Index Number of *The Journal of the American Medical Association* (December 29, 1923, Vol. 81, number 26, page 2,233), under "Gall-bladder," shows the following titled contributions on the subject: Gall-bladder calculus and pregnancy; g. calculus and transduodenal choledochotomy; g. calculus, differential diagnosis; g. calculus, digestive hemoclastic with; g. calculus, digestive juices with; g. calculus, ileus from; g. calculus in common duct, diagnosis and management of; g. calculus is cause, not result of infection; g. calculus, mutual influence of gastro-intestinal tract and; g. calculus, nocturnal colic with; g. calculus, orthology and pathology of extra-hepatic bile ducts in their relation to; g. calculus, pathogenesis of; g. calculus, production of; g. calculus, "recurrences" after operations for; g. calculus, roentgenography of; g. calculus, surgical treatment for; g. calculus, time element in formation of; g. diseases, achlorhydria in; gall-bladder disease in childhood; g. disease, reaction in colon to; g. drainage, nonsurgical; g. evacuation reflex; g. infection: g. infection, pancreatitis as related to; g. inflammation, gastric secretion in; g. inflammation, indications for surgery in; g. inflammation, masked; g. bladder inflammation without gall-stones; and others.

The foregoing list of titles, gathered by a careful agency, covering papers published during the preceding half-year on the subject of gall-bladder, points to the widespread interest in the subject. The large number of papers indicate, besides, the frequency and incidence of the condition. A thoughtful perusal of this list of publications rather indicates, as before stated, that the predominance of interest in this subject by the profession is in the late type of gall-bladder disease as illustrated by the formation of gall-stones. As one sees, the antecedent phases of gall-tract disease,



Roentgenogram showing gall stones removed by operation.

namely, cholecystitis and cholangitis, have not claimed the study and publication to any considerable extent during the past six months. Should this be taken as an indication that the primary conditions just mentioned are overlooked by the physicians? Is it true cholecystitis and cholangitis do not "register" until the gall-stones assert mechanical and inflammatory changes? It is to be hoped that more work will be done and more publications given hereafter in dealing with the primary diseases of the gall-tract with special reference to the etiology, symptomatology and prevention. When the profession becomes alive to the inaugural stages of cholelithiasis and applies preventive measures, there will occur less of the pathology which we now are compelled to consider at such length in current literature. These observations, however, in no wise alter the fact that there is a high degree of incidence of gall-tract infection with gall-stones.

CAUSES OF GALL-STONE FORMATION

An excessive concentration of cholesterolin may be a non-infective cause of calculus. The normal amount of cholesterolin in bile is from 20

to 80 mgm. per 100 cc. of bile; in blood from 130 to 180 mgm. per 100 cc. of blood. It is conceivable that a prolonged excess of cholesterolin in bile may be precipitated in the stagnation of the balance of the gall-bladder and the formation of gall-stone to take place. A pure cholesterolin calculus results.

But infection is the chief cause of gall-stone formation. The typhoid, paratyphoid and colon bacilli from the intestinal tract, streptococci from the mouth, and pneumococcus from the respiratory organs should be mentioned as the chief microorganisms of cholecystitis and gall-stone formation. Conditions which may cause concentration of cholesterolin or may produce stagnation of bile are frequently the associated causes with microorganisms, above mentioned, of gall-stone formation. So it is met with in obesity, tight lacing, and visceroptosis. Associated with cholecystitis and gall-stones, we not infrequently have an acute appendicitis.

THE TIME ELEMENT AND NUMBER

Gall-stones may form in fifty days; recently in the *Journal of the A. M. A.* (Nov. 17, 1923, page 1,671) a case is cited in which gall-stones

formed in eighty-six days; but far more frequently months are required to form gall-stones. Gall-stones may exist and be quiescent for years. There may be one or many. They vary in form and density. In more than half of the cases the gall-bladder is the site of calculi. There may be pure cholesterin calculi. There may be pure cholesterin calculi coated with bilirubin calcium, this constitutes about twenty per cent of all gall-stones and may be taken as an evidence of an inflammation occurring in the gall-tract subsequent to the formation of the cholesterin part of the calculus. There may be mixed cholesterin and

cholangitis, may masquerade as stomach symptoms. In this way attention is drawn to the stomach, to food taking and indigestion—or to “dyspepsia.” The patient complains after eating food—not of the gall-tract but of the stomach. There is a heaviness, a fullness, a distention after eating. He belches after awhile and is relieved of oppression, he probably has heartburn, a distinct discomfort or pain under the right costal border on deep breathing. He suffers from flatulence, dull pain in right hypochondrium, and a pain located under the right shoulder blade.

MECHANICAL EFFECTS OF GALL-STONES

There are certain mechanical effects of gall-stones when they exist in sufficient number or size. A collection in the gall-bladder may produce a pyloric stenosis, obstruction of the common duct, or compression of the portal vein. Impaction of a stone in the cystic duct may set up biliary colic, and, if persistent, produce distention of the gall-bladder, with bile and mucus. This condition may bring about enormous distention of the gall-bladder, a thinning of its wall and a cystic degeneration of its contents. The process may result in a chronic inflammation and atrophy of the gall-bladder. The presence in the common duct of gall-stones may set up attacks of biliary colic. There may be one stone, but the whole duct may be filled with stones. The impaction of the common duct may be the cause of jaundice.

The duct may dilate, however, and relieve the impaction, permitting the bile to flow. In impaction there may be hepatic fever and other symptoms of systemic involvement. It is possible to have a spontaneous cure by the discharge of the calculus into the duodenum. But long before this, surgical treatment should be sought. In the ampulla of Vater, a gall-stone may be lodged and, if of sufficient size, may produce an obstruction. This may cause the bile to flow into the duct of Wirsung, bringing about an acute hemorrhagic pancreatitis. The obstruction of the intestines by a gall-stone occurs, but is rare. Only recently a case has been noted in the literature. Such patients were frequently over fifty years.

INFLAMMATORY AND INFECTIVE CHANGES DUE TO GALL-STONES

With gall-stones in the gall-bladder, inflammatory changes are prone to persistently



Cholecystitis chronica with a stone in the cystic duct. (After W. C. MacCarty. "Collected Papers by the Staff of St. Mary's Hospital, Mayo Clinic," published by W. B. Saunders Co., Phila.) Taken from Barker's "The Clinical Diagnosis of Internal Diseases," Vol. II).

bilirubin calcium calculi. These are the most common and may be taken as an evidence of infection. There may, however, be pure bilirubin calcium calculi. These result from a precipitation of bilirubinate of calcium produced by an inflammatory exudate in the ducts. There are also certain rare chemical formations: as incompletely formed cholesterin gravel, calcium carbonate stones, calculi with foreign bodies in the center.

DYSPEPSIA'S ROLE IN CLINICAL PICTURE

The beginning symptoms of gall-stone, as the initial symptoms of cholecystitis and

reoccur and chronic cholecystitis to supervene. Ulceration, diverticula, scars, hour glass contractions, are some of the changes that follow. In addition a recurrent or chronic pericholecystitis may exhibit adhesions between the gall-bladder and adjacent pylorus, duodenum, transverse colon, and omentum. In such a mass of pathology we may obtain symptoms largely simulating dyspepsia.

News Notes

In Memoriam

WOODROW WILSON

Twenty-eighth President of the United States of America.
Born at Staunton, Virginia, December 28, 1856,
Died at Washington, D. C., February 3, 1924.

To the Physicians of the State:

I wish to inform you regarding the activities of the present legislature with respect to matters concerning doctors and the practice of medicine.

At the beginning of the session a bill was introduced in the House and Senate, re-imposing a license tax on doctors. I at once called together the Legislative Committee, and Dr. Williams, Chairman of the Executive Committee, called together the Council of the Medical Society of Virginia. The Council instructed the Legislative Committee to do everything in its power to defeat the bill, whereupon the Committee busied itself, and with the backing of the component societies and the doctors all over the State, we defeated the bill, as the House Committee passed it by indefinitely and the Senate Committee on Finance reported it out, with the recommendation that it not pass, only three voting for it, and twelve against it.

Dr. W. G. Painter, President of the Wise County Medical Society, in a letter to his Senator, said, in part:

"The physicians of the State will regret very much to see the time come when they shall be looked upon as a purely commercial or revenue producing body, either by themselves or the State. We have higher ideals than this. We aspire to a service far beyond that which can be in or hedged about by mere dollars and cents."

Up to this time, we have been successful also in keeping off any legislation offered by the chiropractors. I doubt very much if they will introduce any further bills during this session.

The Legislative Committee, after consideration, thought it wise to let the Medical Act remain as it is for the present.

Respectfully,

H. U. STEPHENSON, M. D.,

Chairman, Legislative Committee, Medical Society of Virginia.

Legislative Activities of Medical Society of Virginia.

In view of the interest being manifested by doctors throughout the State in medical matters before the present legislature, we asked Dr. H. U. Stephenson, chairman of the Legislative Committee of the Medical Society of Virginia, to prepare us an announcement of what is being done. In the above notice he has told concisely what has been accomplished. We feel we should add that Dr. Stephenson has been untiring in his efforts in behalf of this work and has been most ably assisted by doctors and societies from all over the State. It is simply an evidence of what organization properly directed can do.

Early in the session of the Legislature, it seemed that medical educational standards would be attacked. For this reason, a meeting of the Legislative Committee was called to which were invited local members of the Executive Council and prominent educators. This conference resulted in securing the endorsement of at least the present standards for medical education in Virginia, not only from those assembled but also by letters from presidents of all of the schools of liberal arts in the Commonwealth.

However, the first bill introduced affecting the medical profession was the one for the re-imposition of a license tax on doctors. Dr. Stephenson has explained in detail how this resulted. Upon his request, the Executive Council of the State Society held a meeting which was well attended by men representing every section of the State. Their enthusiasm and work against the imposition of this tax, augurs well for the success of any project the doctors of Virginia wish "to put over." Since Dr. Stephenson prepared his report, this bill

has been defeated in the Senate by a vote of 27 to 4.

It is not known, as we go to press, what, if any, bill will now be presented with regard to doctors. Should the need arise, call will be made on the local societies and individual doctors of the State, and we feel sure they will not fail their committee or society in any emergency.

The Tri-State Medical Association of the Carolinas and Virginia

Is to meet in Greenville, S. C., February 20-21, 1924. The officers of the association have requested the local committee not to provide for any entertainments that will interfere with the scientific work and the main objects for which the members are to be assembled. They are endeavoring to act within the scope of their instructions and at the same time afford the members the opportunity for the best meeting in the history of the Tri-State Medical Association.

Make your reservations in the Imperial or Ottaray Hotels. As the accommodations of these two hostleries will probably be taxed to their fullest extent, it is requested that arrangements be made for at least two in a room, if possible.

The local committee on arrangements from the Greenville County Medical Society is composed of:

Dr. L. O. Mauldin, Chairman, Dr. Hugh Smith, Secretary, and Dr. J. L. Anderson, Dr. R. C. Bruce, Dr. W. C. Black, Dr. E. W. Carpenter, Dr. C. B. Earle, Dr. C. W. Gentry, Dr. S. G. Glover, Dr. I. H. Grimbail, Dr. A. S. Pack, Dr. W. H. Powe, Dr. H. D. Wolfe.

For information as to hotels write the proprietor of the Imperial Hotel or the proprietor of the Ottaray Hotel, Greenville, S. C.; for other information to members of the committee.

Admission of Whisky and Brandy to the U. S. Pharmacopoeia, Tenth Revision.

Announcement has just been made by E. Fullerton Cook, Chairman of the Revision Committee of the United States Pharmacopoeia, that standards for whisky and brandy as medicines will be included in the new Pharmacopoeia now being revised. This is in response to a demand by the physicians of the country.

Under the national prohibition laws, whisky and brandy are classed as medicines and as such are legally prescribed in many cases of serious illness, but at the present time no legal standards exist for their purity.

All physicians of the General Revision Committee, acting as a sub-committee, were appointed to study the situation and take the necessary action. This sub-committee has issued the following statement:

"In view of the fact that a large number of physicians in the United States believe alcohol to be a valuable therapeutic agent, and in view of the widespread adulteration of the alcoholic liquors at present available, the members of this Referee Committee feel that for the protection of the public, there should be an official standard for medicinal spirits."

By including standards for whisky and brandy as medicines, in the Pharmacopoeia, which is the legal standard for drugs and medicines under the Food and Drugs Act, the machinery of the U. S. Department of Agriculture and of the Boards of Health and Boards of Pharmacy throughout the country is enlisted in protecting the sick against adulterated and poisonous products.

Richmond Has Campaign Against Cancer.

In accordance with the plan of the American Society for the Control of Cancer, during January Richmond doctors conducted a campaign against cancer which culminated in a mass meeting held on the 28th. Dr. Paul Howle was selected as general chairman of the movement in this city. The object of the campaign was purely educational. A number of doctors were appointed to appear before the various clubs and civic organizations to give a plain and simple statement of facts about cancer together with advice as to detecting the initial symptoms that patients may seek advice when the disease is in a curable stage.

A great deal of interest was manifested in the campaign, 1,200 attending the mass meeting on the last day, at which Dr. George A. Soper, managing director of the American Society for the Control of Cancer, was the chief speaker. Dr. Robert C. Bryan, state chairman of the Society, opened this meeting and talks were made by several Richmond doctors as well as by Dr. Soper.

Figures given by Dr. W. A. Plecker, director of the Bureau of Vital Statistics, showed that there were last year 1,365 deaths from cancer in Virginia; that the disease is fatal to

one woman in eight and one man in fourteen, over the age of forty years. As cancer at the outset is local in character and frequently curable, these figures should make more people "Stop—Look—Listen."

Married.

Dr. Harry Lee Claud, Newport News, Va., and Miss Julia Marvin Sarvey, in Norfolk, Va., January 5.

Dr. Lawrence O. Snead, Richmond, and Miss Empsie Shapard, Halifax, Va., February 9.

Dr. Horace Orlando Bell, Richmond, and Mrs. Alice Arlina Streit, New York City, recently.

Dr. William Harvey Dixon, Rocky Mount, N. C., and Miss Margaret Freeborn Betts, Richmond, January 19.

Dr. Walter Edward Futrell, Morganton, N. C., and Miss Phoebe Palmer, Sanford, N. C., in Richmond, January 18.

Dr. V. B. Hirst,

Of New York City, a graduate of the University of Virginia Medical School in 1918, recently visited his mother in Purcellville, Va.

Congress on Medical Education, Medical Licensure, Public Health and Hospitals.

All interested are cordially invited to attend this annual congress which is to be held in Chicago, March 3, 4 and 5, at Congress Hotel. The program promises many excellent addresses on various subjects. Dr. Arthur Dean Bevan, Chicago, is chairman of the Council on Medical Education and Hospitals of the A. M. A.; Dr. John Milton Dodson, director of the Bureau of Health and Public Instruction; Dr. Irving S. Cutter, Omaha, president of the Association of American Medical Colleges; Dr. David A. Strickler, Denver, president, of the Federation of State Medical Boards of the United States; and Dr. Frank Billings, Chicago, president of the American Conference on Hospital Services.

The Albemarle County (Va.) Medical Society

Has elected the following officers for the year 1924; President, Dr. Percy Harris, Scottsville; vice-president, Dr. W. E. Bray, University; secretary-treasurer, Dr. F. C. McCue (re-elected) Charlottesville. Meetings are held the first Tuesday of each month. Several new members were elected at the January meeting.

Dr. J. G. Bentley,

Whose address was until recently at Dunbar, Va., is now at Blackwood, Va.

Dr. Newton G. Wilson,

Formerly of Fieldale, this State, after being in North Carolina for some months, has located at Summerfield, N. C.

Dr. Charles A. Easley,

Who after practicing for several years in Bluefield, W. V., went to Pittsylvania County, Va., on account of his health, is now well and is taking up general practice in Chatham, Va.

Dr. G. G. Hankins,

Of Hampton, Va., has received an appointment to the staff of the Philadelphia General Hospital, in which institution he is now taking special work.

Dr. James N. Greear, Jr.,

Of the class of '20, University of Virginia Medical School, who has been at Manhattan Eye, Ear and Throat Hospital, New York City, for over a year, has located at 1740 M Street, Northwest, Washington, D. C., where he will limit his practice to eye, ear, nose and throat.

Child Health Magazine.

With the January issue, *Mother and Child*, for the last four years the official publication of the American Child Health Association and the American Child Hygiene Association, became *The Child Health Magazine*. The pages are doubled in size, and rather fully illustrated. We wish the magazine continued success.

Dr. W. C. Caudill,

Pearisburg, Va., has been elected a member of the board of directors of the First National Bank of that place.

Dr. R. Finley Gayle,

Richmond, associate in nervous and mental diseases at the Medical College of Virginia and extension lecturer of the College of William and Mary, is this month giving a course of lectures in mental hygiene in its relation to education, before the Richmond School of Social Work and Public Health.

Officers with Loudoun Confederate Veterans.

At a meeting held in Leesburg, Va., the last of January, Dr. C. F. Russell, of Herndon, was elected commander, and Dr. J. E. Copeland, of Round Hill, surgeon of the camp.

Members of Hopewell Board of Health.

Dr. J. N. Elder and Dr. W. S. Woody have just been appointed members of the City Board of Health of Hopewell, Va. Other members of the board are Mayor D. Lane Elder and Dr. J. C. Bodow.

The Southwestern Virginia Medical Society

Will hold its regular Spring meeting in Radford, March 20 and 21, under the presidency of Dr. S. S. Gale, of Roanoke. Other officers are Dr. D. L. Kinsolving, Abingdon, vice-president, and Dr. E. G. Gill, Roanoke, secretary-treasurer. A banquet will be tendered the visitors by the physicians of Radford on the evening of the 20th. An attractive program has been arranged, including a symposium on Diabetes by Drs. K. D. Graves, Roanoke. F. H. Smith, Abingdon, Gibson Davis, Christiansburg, and H. H. Trout, Roanoke. Dr. A. M. Showalter, Cambria, will open the discussion on this subject.

The local committee on arrangements is composed of Drs. John J. Giesen, E. G. Hall and J. A. Noblin, all of Radford.

Dr. John D. Stewart,

Of New York City, by invitation, read a paper before the Richmond Academy of Medicine in January. While in Richmond, he was entertained at dinner by Dr. M. C. Sycle.

Dr. and Mrs. Benjamin F. Iden,

Manassas, Va., entertained at a reception on January 27, in honor of their fiftieth wedding anniversary. They have spent their entire married life in Manassas, where Dr. Iden has been engaged in the practice of medicine for more than fifty years. Their two sons, Dr. John Hooe Iden, of the U. S. Navy, and Dr. B. F. Iden, Jr., are also members of the medical profession.

U. S. Civil Service Examinations.

The U. S. Civil Service Commission announces open competitive examinations, receipt of applications to close February 26, for

specialist in maternal and infant hygiene, assistant in maternal and infant hygiene, and expert in maternal and infant care. Full information and application blanks may be obtained from the above named Commission, Washington, D. C., or the secretary of the board of U. S. Civil Service Examiners at the post-office or customhouse in any city.

Open competitive examinations are also announced for medical officer, junior grade; medical officer, grade A; and medical officer, grade B. Applications will be rated as received until June 30, 1924.

Applications will also be received for positions as reconstruction aide (occupational therapy) and reconstruction pupil aide (occupational therapy) until March 11; and for graduate nurse, applications to be rated as received until June 30.

Dr. Greer Baughman,

Richmond, professor of obstetrics in Medical College of Virginia, by invitation read a paper on "The Toxemias of Pregnancy" before the Norfolk County Medical Society on January 28.

Mrs. R. Lloyd Williams,

Norfolk, Va., president of the Woman's Auxiliary to the Medical Society of Virginia, while on a visit to her old home in Houston, Texas, was given a Christmas entertainment by the Woman's Auxiliary of the Harris County Medical Association, at the home of Dr. and Mrs. S. C. Red, in Houston. Mrs. Red is president of the Woman's Auxiliary of the American Medical Association. Dr. Williams, who accompanied his wife on her visit to Texas, was included as one of the honor guests and the local doctors were invited.

Dr. Williams returned to Virginia for the opening of legislature to take his seat in the House of Delegates as one of the representatives from Norfolk.

Citation in the Award of the Sofie A. Nordhoff-Jung Cancer Research Prize.

Dr. Johannes Fibiger, professor ordinarius in pathological anatomy at the University of Copenhagen, has demonstrated, following repeated experimentation, that parasites play an important role in the formation of certain types of tumors in the proventriculi of rats.

Furthermore he has succeeded in effecting papillomata and undoubted carcinoma through the parasite nematode. Where others have failed after years of persistent researches, he first met with success in artificially inducing malignant tumors through external irritations and so thrown wide new avenues to future findings. Though the earlier results of Fibiger's work date back a number of years, he unremittingly labored towards an interpretation of the significance of parasitic irritants in malignant tumor formation, likewise of mechanical and chemical irritants. Fibiger and his associates have contributed generously to the literature of cancer production through the feeding to rats of oats and the application of tar to their tissues. In this way they have confirmed the successful work of Stahr and Yamagiva.

In a word, Fibiger's advances towards the solution of the problem of the causative irritants productive of cancer are at the same time most comprehensive and most remarkable.

His name will ever appear inscribed on the first page of the History of Cancer Research.

The Commission on the award consisted of Professors Borst, Doederlein v. Romberg and Sauerbruch, all of the University of Munich.

Newport News Doctors Visit Richmond Hospitals.

Dr. Joseph T. Buxton, of the Elizabeth Buxton Hospital, Newport News, Va., accompanied by about twenty doctors from that place, recently visited Richmond and inspected the new Johnston-Willis Sanatorium and the McGuire Clinic. They were highly enthusiastic in their praises of both institutions.

Dr. E. E. Walker,

Recently of Phenix, Va., is now associated with Dr. Samuel W. Price, of Scarbro, W. Va., in the practice of medicine.

Bank Directors.

Dr. W. C. Powell and Dr. F. J. Wright, Petersburg, have been elected members of the board of directors of the Banking Trust and Mortgage Company of that city. Among the other directors are Dr. W. W. Seward, of Surry, and Dr. W. P. Hoy, of Petersburg.

Dr. Lawrence T. Price,

Richmond, has been elected commander of Stonewall Jackson Camp, No. 981, Sons of Confederate Veterans.

Dr. P. D. Lipscomb, also of this city, was re-elected surgeon.

Fire at Memorial Hospital, Winchester.

Fire of undetermined origin destroyed the central portion of the main building of Memorial Hospital, Winchester, Va., early on the night of the 18th of January. The loss of approximately \$100,000 was only partially covered by insurance. All patients were removed in safety to homes and local hotels.

We have not been advised as to future plans for the hospital, but, as it had practically outgrown its present building, it is probable that a new hospital may be built on another site.

Directors of a Richmond Bank.

Dr. M. L. Anderson and Dr. J. R. Blair, both of Richmond, have been elected among the directors of the Systematic Savings Corporation, of this city.

Dr. Virgil Hammer,

One of the best known physicians of the Valley of Virginia, has been critically ill at his home in Luray, Va.

Superintendent of St. Luke's Hospital Resigns.

Miss Martha Baylor, for the past five years superintendent at St. Luke's Hospital, Richmond, resigned February 1. Miss Baylor is president of the Virginia State League of Nursing Education and has been actively interested in advancing the standard of nursing education in Virginia. She plans a special course of study at Columbia University, New York City, after which she expects to devote her time to teaching.

Miss Elizabeth Hendricks, formerly in charge of the operating room at St. Luke's, has succeeded Miss Baylor as superintendent.

U. S. Veterans' Bureau in Danville Closed.

The United States Veterans' Bureau, established in Danville, Va., for more than a year, with Dr. Claude N. Rucker in charge, has been closed and Dr. Rucker has been transferred to Huntington, W. Va. Dr. Rucker

had three hundred cases under his supervision while in Danville. That district will hereafter be looked after from the Roanoke office.

Dr. W. Armistead Gills,

Formerly of Richmond, but with the United States Navy since June, 1917, has been placed on the list of retired officers of the U. S. Navy. Dr. Gills' last service was on the Asiatic squadron.

New Business Manager at Hygeia Hospital.

Mr. W. L. Lucas, for nearly ten years credit manager of O. H. Berry & Company, of this city, has accepted the position as business manager of Hygeia Hospital, Richmond, the change becoming effective in January. The office Mr. Lucas holds is a new one at Hygeia Hospital and has been created on account of the large increase in number of patients cared for there. The hospital is owned and operated by Dr. J. R. Blair. At present it is undergoing a number of improvements.

On Hospital Board.

At a recent meeting of the board of directors of the Petersburg, Va., Hospital, Dr. William F. Drewry was re-named vice-president, and Drs. R. A. Martin and H. G. Turner were among those named as members of the board.

Dr. W. Brownley Foster

And family, of Roanoke, Va., were recent guests of Dr. Foster's parents in Richmond.

In the Confederate "Hall of Fame."

On February 2nd, there were presented to Battle Abbey (the Confederate Memorial Institute), Richmond, bronze busts of two of Virginia's most renowned and beloved members of the medical profession—Hunter Holmes McGuire, M. D., and Rawley White Martin, M. D. Not because of their achievements in the medical world were they thus honored, but because of their patriotism and of the fact that they were leaders of men in peace as well as in war.

The bust of Dr. McGuire was presented by Senator Don P. Halsey, of Lynchburg, Va., and accepted by Dr. J. Allison Hodges, of Richmond; that of Dr. Martin was presented by Dr. Stuart McGuire, of Richmond, and accepted by Mr. Randolph Harrison, of Lynchburg. Most fitting was this double presentation as Dr. McGuire and Dr. Martin were closely

associated in the medical history of Virginia and were life long friends. In this issue of the journal* we give the speeches of presentation. We regret space forbade our making claim for the speeches of acceptance also, as they too bore fitting tribute to the lives of these two noble men.

*See pages 787-790.

Dr. P. L. Hill,

A medical missionary to Choon Chun, Korea, who has been on a furlough in this country on account of his health, was a recent visitor in Richmond, where he delivered several addresses. He graduated from the Medical College of Virginia in 1917 and has many friends in this State. Dr. Hill expects to return shortly to his post of duty.

Income Tax.

Every one is now so familiar with the payment of Federal income tax that it is only necessary to state that returns, with first payments should be made to the collector of internal revenue for the district in which you live by March 15th.

The Alleghany County Medical Society,

At its meeting in Clifton Forge, January 15, elected the following officers for the ensuing year: President, Dr. W. H. F. Miller, Clifton Forge; vice-president, Dr. J. V. Jordan, Covington; secretary, Dr. R. P. Hawkins, Jr., Clifton Forge; and treasurer, Dr. W. M. Revercomb, Clifton Forge.

The Mercer County (W. Va.) Medical Society,

At its annual meeting held recently, elected Dr. Joseph B. Kirk, Bluefield, president, and Dr. Walter W. Harloe, Matoaka, secretary-treasurer.

Erratum.

In the list of officers of the Warwick County (Va.) Medical Society, in the January issue (advertising page 32), we gave the name of Dr. O. T. Amory as secretary. This should have been Dr. A. D. Ownbey, secretary, Dr. Amory being vice-president.

Cancer,

A practical quarterly journal devoted to the best interests of cancer, which made its first appearance in October, is published by J. B. Lippincott Company, East Washington

Square, Philadelphia, and not by F. A. Davis, as stated at that time. The price is \$5 a volume in North America. Dr. L. Duncan Bulkley has associated with him in the editorial work some of the country's best informed men on the subject of cancer.

The Rockefeller Foundation,

Located at 61 Broadway, New York City, has issued its annual report for 1922. In addition to giving the annual reports of the president, secretary and treasurer, it tells in detail of much of the work done by the Foundation, especially in foreign countries. The illustrations are good and add much to the interest of the report.

Revoke Charter.

It is announced that the circuit court at Richmond, the latter part of December, revoked the charter of the Oriental University, operated in Washington, D. C., with charter obtained from Virginia. It had for some time been known to be a fraudulent institution and was considered one of the "diploma mills."

Dr. Lewis B. McBrayer

Has resigned as superintendent of the N. C. Tuberculosis Sanatorium, at Sanatorium, and will be succeeded by Dr. Paul P. McCain, who has been assistant superintendent.

Motion Picture for Health Associations.

The Metropolitan Life Insurance Company, 1 Madison Avenue, New York City, with the advice of the National Health Council, has produced a motion picture of two reels, entitled "Working for Dear Life," with an idea of giving the audience at least a working idea of what a thorough health examination should be. The scenario is said to be well planned and the argument convincing.

With the idea of promoting health conditions throughout the country, the above named company will send the film free, except for transportation charges, to Health Associations and other organizations desiring it.

Graduate Nurses' Association of Virginia Undertakes Big Project.

This Association has pledged itself to raise \$50,000, through its own efforts for the endowment of a chair of nursing at the University of Virginia. Such a course would give nurses in this section an opportunity to secure near home the graduate work for which they now have to go to Northern schools. It is

stated that the proposed chair of nursing will be the first of its kind in the South. As a means to raising part of this endowment money, groups of nurses in several Virginia cities plan to put on a pageant simultaneously throughout Virginia on May 12, the birthday of Florence Nightingale. This pageant is to show the development of nursing since the days of Florence Nightingale, with special reference to the growth of the profession in this state.

Increase in Number of Deaths From Automobiles in Virginia.

Dr. W. A. Plecker, State Registrar, states that although deaths from violence in many forms are on the increase, none can compare with the great increase in automobile deaths, as shown by comparison for the first nine months of 1922 and for a similar period in 1923. For 1922, there were 94 deaths recorded in Virginia from automobile accidents, for the first nine months; in a similar period in 1923, there were 137. There were only 142 deaths for the whole of 1922. Should this rate of increase continue for the next ten years, the automobile will soon be a major cause of deaths in this State.

A New A. C. S. Monograph

The publication of a new American Chemical Society Monograph is announced by The Chemical Catalog Company of New York. This recent book by Dr. George W. Raiziss, Ph.D., and Joseph L. Gavron, B. S., is entitled "Organic Arsenical Compounds," and is a most comprehensive work on this subject.

Doctor Raiziss, Professor of Chemotherapy, Graduate School of Medicine, University of Pennsylvania, was the first laboratory worker in the United States to successfully develop American-made arsphenamines for use in the treatment of syphilis. Mr. Joseph L. Gavron has been associated with Doctor Raiziss in literary and laboratory work done in The Dermatological Research Laboratories of Philadelphia.

The Eastern Division of the American Roentgen Ray Society

Held its annual meeting in Atlantic City in January, Dr. Thomas A. Groover, of Washington, D. C., presiding. It was an excellent meeting and well attended. Virginia doctors in attendance were Drs. A. L. Gray, Fred M. Hodges, C. M. Hazen and D. D. Talley, of Richmond, James W. Hunter, of Norfolk, J. T.

McKinney, of Roanoke, Hunter B. Spencer, of Lynchburg. Dr. Charles Eastmond, of Brooklyn, was elected chairman; Dr. Ralph D. Leonard, of Boston, vice-chairman, and Dr. Fred M. Hodges, of Richmond, Va., secretary. The meetings are held in January of each year at Atlantic City.

Dr. Bell Succeeds Dr. Maloney With Richmond Health Bureau.

Dr. G. R. Maloney, for nineteen months with the Bureau of Health of the Department of Public Welfare of Richmond, resigned his position as chief of the division of communicable diseases, the first of February, with the intention of entering general practice. He has been succeeded by Dr. H. O. Bell who recently joined the Bureau in the capacity of medical inspector.

Dr. Oldham Escapes From Perilous Position.

Dr. M. C. Oldham and a friend, of Lancaster, Va., had a narrow escape from death, the middle of January while out duck hunting. A terrific wind storm broke and, despite strenuous efforts, they were unable to make shore. After dark they began firing guns with the hope of attracting help. Owing to the high wind, the report of the guns could not be heard but they were finally sighted by the blaze from the muzzles of their guns and help was sent them. They were much exhausted from their experience and suffered greatly from the intense cold.

In Charge of Health Units.

Dr. E. L. Sutherland, formerly of Roanoke, Va., took charge of the Nansemond-Suffolk joint county and city health unit, beginning January 15, succeeding Dr. I. C. Riggins who resigned to take up a course of study at the Johns Hopkins School of Public Health Administration.

Dr. E. D. Woodard, of Bayboro, N. C., has entered upon his duties in charge of a health unit in Isle of Wight County, Va.

A Word of Appreciation.

We wish to express our thanks to members of the Medical Society of Virginia for their splendid co-operation in sending checks to cover 1924 assessments in response to the "blue slips" placed in the January journal. It is gratifying to learn from this response also that the VIRGINIA MEDICAL MONTHLY "is not without honor" in its own state.

Don't forget, however, that our advertisers

are entitled to a portion of the time you can spend in looking over our pages.

The Virginia Tuberculosis Association,

At its annual meeting in Richmond, January 18, elected Dr. Charles R. Grandy, of Norfolk, president. He succeeds Captain W. W. Baker who had been president since the organization of the association. Captain Baker was elected honorary president. Dr. William M. Smith, of Alexandria, was elected executive secretary, and Dr. E. C. Levy, of Richmond, was elected first vice-president.

The Norfolk County Medical Society

Has adopted the report of the special Committee on Narcotics, urging members to refer all cases of drug addiction to the City Health Department for appropriate hospital treatment. It also advised total discontinuance of the dispensing of narcotics, issuing prescriptions instead, thereby lessening liability to reproach.

Dates Set for State Society Meeting.

At a meeting of the Executive Council on January 22, the dates were set for the Staunton meeting of the Medical Society of Virginia, as October 14, 15, 16 and 17, 1924. It is announced that the new hotel will be completed in the Spring. This with the Virginia Hotel with which it is connected, the Beverley, the Y. M. C. A., and other places which may be secured in case of necessity, should provide ample accommodation, though it is always well to make reservation as far in advance as possible, so as to be at the hotel of choice. The doctors of Augusta County are manifesting much interest in the approaching meeting and will shortly announce committees in charge of the various features of the meeting.

Dr. Garnett Nelson

Has been re-elected president of the Richmond Tuberculosis Association for the ensuing year.

Dr. R. W. Garnett,

Health Officer of Danville, Va., has declined an offer to become health officer of Greensboro, N. C., that he may continue with the work he has been doing in Danville.

New St. Luke's Hospital in Bluefield, W. Va.

Early in January, the new St. Luke's Hospital was opened in Bluefield, W. Va. Located in the residential section of the city, the hospital is a model of completeness in every

respect and thoroughly fireproof. Dr. C. M. Scott, assisted by Dr. T. E. Vass, is in charge of the surgical department, and Dr. R. H. Hoge is in charge of the medical department. The hospital can care for approximately one hundred patients. The nurses's home in a separate building has sixteen large rooms, likewise equipped with all modern conveniences. So far as known, this hospital is the first institution of its kind in the world to be thoroughly equipped with radio. Each bed in the hospital is provided with a head piece and the system is so devised that when a patient has callers, all who care to may "listen in."

The National Committee for Mental Hygiene,

At its annual meeting recently held in New York City, re-elected Dr. Frankwood E. Williams, of that city, medical director for the ensuing year.

Health News.

The first weekly issue of this bulletin, published by the New York State Department of Health, made its appearance in January. It "inaugurates a policy of furnishing information on current events in public health, to the health officers, public health nurses, physicians, organizations and individuals interested in public health work." Dr. Nicoll is to be congratulated on this evidence of progress in his department.

Dr. C. C. Coleman,

Richmond, has returned from a trip to Florida, where he enjoyed a winter vacation.

Have You Told Your Patients About "Hygeia"?

This journal of "individual and community health" is published monthly by the American Medical Association at the price of \$3 a year. It is intended primarily for the layman but furnishes interesting reading for any one. Highly educated people are frequently ignorant of the fundamental principles of health, but they are always interested in learning something of what the doctor knows. This magazine if generally read by laymen should do much in helping the doctor in his fight against quackery.

Fire in Clinic Building at Johns Hopkins.

A fire believed to have been caused by a short circuit broke out in a machinery room directly beneath one of the operating rooms in the women's clinic building at John Hopkins Hos-

pital on January 30. Three women prepared for operation were removed and the flames were confined to the one building.

Obituary

Dr. Claybrook Fauntleroy,

Of Dragonville, Va., died at the home of a sister in Richmond, on January 10. He had been in bad health for sometime. He was born in King and Queen County, Va., sixty-four years ago and received his medical education at the University of Pennsylvania, Philadelphia, from which he graduated in 1882. Dr. Fauntleroy had been a member of the Medical Society of Virginia since 1888. He is survived by his wife and a large family connection.

Dr. Paulus Fitz James Miller,

Of Virginia Beach, Va., after having been in bad health for sometime, died at a Norfolk hospital, January 19. Interment took place in Richmond. Dr. Miller was sixty-nine years of age and was a member of the Medical Society of Virginia. He was a physician of the "old school" and was much beloved in his section.

Dr. Henry Dorrance Beyea,

A retired surgeon of Philadelphia, who had recently made his home at Ware Neck, Va., died early on the morning of January 20th. He was apparently in good health, having been out in the neighborhood the previous afternoon. Dr. Beyea was fifty-six years of age and a graduate in medicine from the University of Pennsylvania in 1891. He had joined the Medical Society of Virginia a few months ago. He is survived by his wife and four children.

Dr. Luther Emmett Holt,

One of the best known pediatricians of this country and professor of diseases of children in Columbia University, College of Physicians and Surgeons, New York City, died in Peking, China, the middle of January, from heart disease. Last Fall, he was assigned by the Rockefeller Foundation as visiting professor of pediatrics to the Peking University Medical College and had just about completed the course of lectures which he was to give in that city. He was sixty-eight years of age and had graduated in medicine from Columbia University, New York, in 1889.

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Virginia Medical Monthly

OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Vol. 50, No. 12.
WHOLE No. 861.

RICHMOND, VA., MARCH, 1924

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CALCREOSE

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—John Guy: Pulmonary Tuberculosis; Its Diagnosis and Treatment, 1923, p. 252.

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RICHMOND, VA., MARCH, 1924

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Original Communications

HEMORRHOIDS UNDER REGIONAL ANESTHESIA.*

By STANLEY H. GRAVES, M. D., F. A. C. S., Norfolk, Va.

Since it has been proven that the only satisfactory method for curing hemorrhoids is by operation, every effort should be put forward to successfully combat the suffering and discomfort incident to hemorrhoidectomy, and an operative technic worked out, and adopted, that can be speedily performed, without pain or great inconvenience to the patient. The writer believes that, with the use of regional anesthesia, such a method is at our disposal and, in the hands of a skilled operator and properly utilized, should not cause any pain, at the same time being safe, simple and satisfactory.

After the patient has been examined, hospitalized, and prepared, one of four methods of operative procedure are at one's disposal. Named in their order of popularity, they are the ligature, clamp and cautery, excision of veins, and the Whitehead operation. My preference is the ligature. It appears to be the method of choice, has been utilized in the removal of hemorrhoids for many years, and is still universally employed by surgeons throughout the world. Few instruments are required, the operation can be performed in a few minutes, and is very rarely accompanied by profuse bleeding or post-operative complications.

The next is the clamp and cautery, especially useful in the removal of internal hemorrhoids. In fact, this method is applicable to so many cases, that it is often a personal preference with the operator as to whether he utilize the ligature or clamp and cautery. The few disadvantages of the method are hemorrhage, and the failure of the cautery to work at the appointed time. I have greatly overcome this difficulty by using the electro-cautery. Some

little practice and experience will be required with this type of cautery to properly regulate the heat. If the point is too hot, it predisposes the case to hemorrhage and, in touching tabs, the transmitted heat may cause the skin edges to slough, which is invariably followed by much discomfort and pain.

The excision method is occasionally used on very large external piles. Here the tumor masses are removed in successive stages, first an incision, dissecting out the large veins, suturing or ligating them, and then suturing of the wound. The operation is comparatively safe, and discomfort or post-operative complications are as infrequent as with the simple ligatures. I rarely employ the Whitehead operation; it has too many disadvantages to commend its frequent use. It should be utilized in only a few selected cases, then by a skilled operator.

When considering regional anesthesia for the removal of hemorrhoids, we have two routes for selection. The sacral block and the ano-rectal field block. Caudal or sacral anesthesia is accomplished by passing the needle through the sacral hiatus, and depositing the anesthetic in the sacral canal. This opening is the result of defective closure, or non-closure of the laminae of the last sacral vertebra, and is covered by the sacro-coccygeal membrane. The hiatus lies at about the junction of the sacrum and the coccyx, and is bounded by the sacral cornua on each side, and the spinous process of the fourth sacral vertebra above. It has the shape of an inverted "V." The sacral canal is a prismatic space occupying the whole length of the sacrum, and is connected with spinal canal by its upper extremity, its lower extremity being the sacral hiatus.

With the patient lying flat on his stomach, and a cushion under his hips to raise the sacral region, and render the landmarks more accessible, the sacral hiatus is located by passing the index finger on the middle of the back from the tip of the coccyx toward the sacral region. A depression will be felt about the junction of

*Read at the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

the coccyx with the sacrum, and outlined by the sacral cornua on either side and the spinous process of the fourth sacral vertebra in the midline above. The outlining of these three points, that are palpable in the majority of cases, will define a triangular space, at the middle point of which the needle is introduced with ease and success. A spinal puncture needle, with its stylet in and the bevel turned upwards, is introduced through a wheal of novocain raised at this point, at an angle of about twenty degrees, with the normal to the skin surface at the site of the puncture. After piercing the sacrococcygeal membrane, the needle strikes the anterior wall of the canal. It is now withdrawn slightly, and the body of the needle depressed, and advanced gently and gradually into the canal, keeping in the middle line until about 6 c.m.—2¼ inches—has been introduced. If there is obstruction a short distance from the point of entrance, a little manipulation of the sacrococcygeal membrane and gentle movement of the needle will usually release it. If this is not successful, the needle must be withdrawn and introduced a little higher up. When in correct position, the stylet is withdrawn, and a little time is allowed to make sure that no blood or cerebrospinal fluid comes out. If this should occur, the needle is withdrawn slightly until the flow ceases. It is best, before making the injection, to attach the empty syringe and make the aspiration test before the solution is introduced, so as to be quite certain that no intraspinal or intravenous injection is made.

The syringe is now filled with the solution, which consists of 30 c.c. of a 2 per cent solution of novocain and is slowly injected. A very good point to remember is that when the needle is correctly in the sacral canal the fluid passes in very easily, and free from pain but, when not in the canal, considerable pressure is required, and the patient will complain of some pain. In my work I have preferred the novocain put up in the following combination:

	Sodium Bicarb	0.15 gm. (pure)
	Sodium Chlo	0.10 gm.
For a 2% solution:	Novocain Hydroc	0.60 gm.
	Distilled water	30.00 c.c.

Five drops of adrenalin is added at the time of use.

The injection having been made, the patient is directed to turn on his back. Anesthesia will not set in satisfactorily for fifteen minutes,

and can be tested with a needle or clamp on the skin around the anus.

The ano-rectal field block is performed by introducing the novocain around the lower segment of the rectum, catching the nerves outside, and away from the bowel. The patient is placed in the lithotomy position, and from two to four small wheals of novocain are made around the anus and about 2 c.m. from the hemorrhoids. If this is done with a very small needle and the skin pinched up when the needle is introduced, patients will very rarely complain of the puncture. A 5 c.m. needle with some flexibility is now introduced in the various wheals and a circular injection made under the integument. This injection greatly relieves the sensitive condition of the piles, and admits the passage of the finger into the rectum without discomfort. At this point, a 10 c.m. flexible needle is affixed to the syringe, and introduced at the injected points successively and passed along the inner aspect of the sphincter muscle, injecting the fluid as the needle is introduced, the finger in the rectum guiding the needle and eliciting the quantity of solution injected by the submucons bulging. In about ten minutes the anesthesia should be complete. Very rarely will the sphincter require any dilatation, for under regional anesthesia the tissues relax themselves. A ½ to 7/10 per cent solution is used and 50 to 80 c.c. will be the usual amount required. Two to 3 drops of adrenalin chloride is added to each 10 c.c. of fluid.

In a series of one hundred hemorrhoidectomies in my service at the Sarah Leigh Hospital, the following anesthetics were used:

Sacral Block	61
Gas Oxygen	22
Ether	8
Sacral & G. O.	3
Lower Field Block	5
Gas Ether	1

Five of the gas oxygen cases had sacral block which failed to work satisfactorily; two of the ano-rectal block had sacral injections that proved to be inadequate. The after effects or complications may be enumerated as follows:

Three complained of considerable pain in and around the field of operation, all three clamp and cautery; one hemorrhage, a clamp and cautery; one sloughing of the outside skin, caused by use of cautery on tags after the employment of ligature; four cases complained

of some pain in the sacral region radiating toward the hips for a few days, which then entirely disappeared. It must not be overlooked that all of this series were hospital cases and none of the variety treated in the office, such as thrombotic piles and skin tags.

After the operation, a suitable wedge-shaped dressing is placed over the anus and a well fitting T-binder is applied. Sometimes a tube or wick of gauze, well coated with vaseline, is used in the rectum, but they predispose to pain, difficult micturition and hemorrhage when removed, *therefore*, should be discouraged in all uncomplicated cases. The changing of the outside dressing as may be required and the use of morphia and a hot water bag over the dressing as needed for pain, and liquid diet, constitute the after treatment. A gentle cathartic is given on the second or third night, the bowels acting as a rule during the forenoon of the following day. After the bowel evacuation, the patient is placed in a tub of hot water for ten or fifteen minutes, then dressed. Deod. Tr. Opium may now be resorted to for pain and any tendency to straining; soft diet is ordered for two days; when general diet is permitted. The stay in the hospital is from one week to ten days for clamp and cautery and ten days to two weeks for ligature and excision. If the injections are made correctly, and the solution represents its full strength, the entire field of operation should be so anesthetized that all manipulations are perfectly painless, unless rough handling, and undue pulling against the adjacent unanesthetized tissues cause excitement and distress.

In my experience there have been no ill effects from this method, and it certainly reaches the ideal more nearly than any method known today. It is applicable to almost all cases, especially in the very old and infirm, and where other anesthetics are contra-indicated. The tissues are nicely relaxed, *thereby* overcoming much trauma incident to the manual stretching of the sphincter, and the block—lasting from one to one and one-half hours, prevents a great deal of after suffering. Patients are freed from painful shock, post-operative shock, and vomiting which often follow the general anesthetic. Failures are generally due to technical errors, congenital defects, occlusion of the sacral foramen, traumatized pelvis and malignancy of the sacral canal.

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DISCUSSION.

DR. S. S. GALE, Roanoke: I think the Doctor has covered the ground on regional anesthesia in hemorrhoidectomy very thoroughly. Personally I have had some experience in the use of caudal block in operating on internal hemorrhoids.

I had the misfortune to do a caudal block not long ago, not on an internal hemorrhoid case but for stricture of the urethra, and I lost my patient. This patient was a very sick and very much run down man and had retention of urine, cystitis and poor kidney function. For that reason I thought the caudal block would be the safest anesthesia. In this case I overlooked the point which the Doctor has made in doing these blocks, that is not passing the needle further than 6 cm. into the caudal canal. While I had studied the technic of several different clinics I had failed to grasp the point the Doctor mentioned of not passing the needle into the canal beyond 6 cm. After passing the needle into the canal, attach the syringe and see if blood or spinal fluid can be aspirated into the syringe. If so, change the position of the needle until no fluid nor blood runs into the needle. Labat states that often if no fluid can be aspirated this is not positive proof that the needle may not be in the spinal canal and that the only certain method of keeping the needle out of the canal is not to pass it beyond 6 cm. After this unfortunate occurrence I carried on quite a lengthy correspondence with Dr. Labat. I described this case to him and asked him if he could tell me why the patient died. Of course the correspondence was unsatisfactory as he did not see the patient and did not know me nor my technic, but after summing up the matter I feel certain that I put the needle in too far.

I have used caudal anesthesia in a number of cases and have never had any accidents nor any bad results except in this case which I wanted to bring to your attention.

I make it a rule never to put anything in the rectum. Of course, Dr. Graves made the point that nothing should be put into the rectum except when it is necessary to control hemorrhage. If you do put anything into the rectal canal you will have pain. In my cases I have never had a post-operative hemorrhage.

In regard to the after treatment and the movement of the bowels, I have adopted the plan of starting these patients on mineral oil as soon after the operation as possible and in two or three days the bowels will move.

DR. WILLIAM E. ANDERSON, Farmville: I would like to take about two minutes to say hemorrhoids can be operated on with local anesthesia fairly well. Local anesthesia will in many cases prove entirely satisfactory, but, when there is to be a considerable number of hemorrhoids removed, especially when high up, general anesthesia is preferable and the clamp and cautery is the procedure for removable.

DR. WALTER COX, Winchester: I came over especially to hear this important paper, and I was very much interested when he said he had performed the operation practically without pain. This is the first question patients always ask me.

We have a very peculiar situation at Winchester. Three of my patients have refused to go to the sur-

geons for fear of the pain. These people are going to some quacks at Grand Rapids, Mich. These people, Burlison Bros., have a painless operation for hemorrhoids. I know this because I have talked personally with patients—and they get results—some form of electric treatment. I have examined three people who came back most enthusiastic.

I have been trying to find out their methods, have written for equipment, etc. These people put the patient on the table twice in severe cases, but in other cases only once. They do it by putting some kind of electric needle in the rectum.

One man was cured of prolapse of the rectum, hemorrhoids and fistula. I would like to know more about these people and in some way learn the secret.

Dr. ———: I do considerable rectal work. I took some work under Dr. ———*, of New York, and I would like to say he never dilates the sphincter, never uses deep traumatism, as it increases discomfort. During my stay with him he had good results with evidences of very little pain.

He never uses opiates, whether done under local or general anesthesia. He has written several books on diseases of the colon and rectum.

Dr. GRAVES, closing discussion: I want to thank all of the gentlemen for their discussion. It is very nice to have them bring out these important points.

I think Dr. Cox must have gotten the wrong idea about the opiates. I said I sometimes used a hypodermic of morphia. I operated on a young man a few days ago who had right much pain, but he is the first one I have had to give more than one dose of morphia in the last several cases. The report that Dr. Cox gave of an unusual treatment for hemorrhoids reminds me of some other treatments that used to be considered cure-alls. One especially was the cancer cure. These quacks guaranteed to cure cancer with a paste. One application of the paste was enough. One dose of salvarsan used to be considered a cure. I feel sure that all of you will recall some of these cases returning for further treatment if they only lived long enough.

*Stenographer failed to obtain names.

URETERAL CALCULI.*

By JOHN H. NEFF, M. D., University, Va.

This paper is based in the main upon an analysis of the clinical records of fifty-eight cases of ureteral calculi. While the group is not a large one, a review of the contained data may at least emphasize points of symptomatology and diagnosis which can hardly be restated too often. Certainly this is true if judged by the statistical revelation of diagnostic error.

The most striking, yet not surprising, fact disclosed by this study was the inability in any instance to ascribe a definite cause for the stone. It was uniformly assumed that the calculus had formed in the kidney, from whence it had entered the ureter and there lodged. Hunner believes that a goodly proportion of ureteral calculi develop primarily

in the ureter, that a pre-existing ureteral stricture is responsible for the inauguration of the stone forming process. While it was evident from the size of some of the stones that considerable increment must have occurred after entrance into the duct, our analysis yields no information of either a positive or negative character about Hunner's theory. The researches at the Mayo Clinic in recent years place greatest stress on abnormal bio-chemical processes and specific infection as the important etiological factors in lithiasis rather than on mechanical obstruction. A discussion of the many theories of stone formation, however, would lead one far afield and is beyond the proper limits of an avowedly clinical summary. The solution of the problem will aid materially in the prevention of recurrences but it is rather probable that calculi will continue to be the most frequent cause of serious ureteral obstruction.

It is will-nigh axiomatic that obstructive lesions in the upper urinary tract are commonly deceptive in their symptomatology. No exception to this rule is found in the series under discussion. Characteristic renal colic, with its severity and typical radiation from the kidney to the bladder or bladder to the kidney and the further frequent extension to the external genitalia and down the thigh, is too clear cut and too familiar to warrant mistake in diagnosis. But our records show that in one-third of the patients the pain departed from what might be called this text book type.

In fifteen per cent of the series all the pain is stated to have been in the lower quadrant of the abdomen. The most usual site was at a level just within the midpoint of Poupart's ligament and from here radiating downward. The predominant pain in a few has been further out toward the umbilicus and with practically no extension elsewhere. Eleven patients—eighteen per cent—have had all their pain in the upper half of the abdomen, most pronounced usually in the kidney region, but only too often infringing on the so-called gall-bladder territory or, as complained of in one case, even most marked in the epigastrium. The ready possibility of diagnostic error in either the upper or lower right abdomen is quite obvious where such pain is associated with active nausea, a little temperature and some tenderness. One unique case had no pain whatsoever. This patient was admitted with a quite typical history of left side pyone-

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phrosis. Routine X-ray examination of the urinary tract revealed a characteristic shadow in the line of the left ureter but also a very suggestive shadow on the right side. Cystoscopic study demonstrated conclusively that the shadow on the right side was a stone and the stone was removed by operation. We have seen many cases of silent renal calculi but this is our first experience with a symptomatic quiescence on the part of a ureteral calculus.

Error in diagnosis is naturally more liable to occur with stones on the right than on the left. Thirty-eight of the fifty-eight cases had their stones in the right ureter. In this group, four—ten per cent—had had abdominal operations for the same symptoms prior to recognition and removal of a ureteral calculus. Four appendectomies and one exploration of the gall-bladder composed the list, one of these operations being accredited to us and three to other surgeons. In another ten per cent of these patients with right sided stones, our pre-operative diagnoses were wrong, somewhat retrieved possibly by the fact that the true condition was discovered at operation and corrected. The diagnoses in these four latter cases were,—appendicitis twice, gall-bladder disease once, appendix abscess once. The diagnosis of an appendix abscess was made in a patient admitted as an emergency with signs of an acute inflammatory process in the abdomen, exquisite tenderness and an ill-defined mass just medial to the anterior superior spine of the right ilium. The condition proved to be a ruptured ureter with extensive extravasation of urine secondary to a calculus. Two of these patients for whom our pre-operative diagnosis was incorrect had been X-rayed with negative findings and also cystoscoped, one with ready catheterization of the suspected ureter, in the other the ureter could not be entered because of spasm. A wax tipped catheter was not used in the first patient; the examination was not repeated in the second. Either by ourselves or other surgeons, therefore, the appendix or gall-bladder have been unjustly inculpated in twenty per cent of the patients with right sided stones, and in ten per cent unnecessary operations were performed. These figures lend support to the argument for an incision sufficiently large for thorough exploration where the pre-operative diagnosis in the right abdomen is in any degree uncertain, and suggest further that exploration must be

carried out no matter how many concretions in, bands about, or kinks of a non-inflamed appendix are found.

In a bare majority of the patients tenderness was elicited either in the kidney region or along the course of the ureter. Tenderness has, of course, been greatest in the presence of an accompanying pyelitis or pyonephrosis, though anything approximating heavy infection has been relatively infrequent for the whole group.

The urine was negative for pus or blood in four instances, that is, seven per cent of the series. The urine of thirty-one patients contained blood and pus in various proportions, sixteen cases only pus, seven only blood. There was a wide variation in the cellular content of the urine from the same patient upon repeated urinalyses.

The X-ray examination was negative in six of the fifty-five exposures, a percentage of eleven. In each of these six cases the calculus was later demonstrated by other means—by its passage, by operation, or by the cystoscope. The fallibility of the X-ray in demonstrating ureteral stones is, of course, well recognized by surgeons and urologists. It is possibly doubtful if general practitioners realize that some excellent roentgenologists make the statement that the failure of demonstration is as high as twenty or twenty-five per cent. Certainly the average patient seems to hold the conviction that the X-ray is all revealing and can tell no lies.

It has also to be borne in mind that characteristic pain, a positive urine, and seemingly typical shadows on an X-ray plate do not fully justify a diagnosis of ureteral calculus. The suspected shadow must be proven to be a stone by cystoscopic methods, alone or in conjunction with the X-ray. Thus we have had occasion to identify a calculus by use of a wax tipped catheter in nine instances, by a ureterogram in another nine cases, and by demonstrating apposition of the shadow and an opaque catheter in fifteen cases. Failure to prove the nature of suggestive shadows may lead to unnecessary operations upon the ureter. For example, we have found pyonephrosis the true condition in a man previously operated upon for ureteral calculi but none found. The first diagnosis had rested on a basis of typical colic, a bloody urine, two shadows low in the pelvis and a bloody efflux from the right ureter.

A plate with a leaded catheter in the ureter showed the shadows were extra-ureteral.

The cases here reported have been seen during the past fifteen years. During this period there has been what might be termed a revolutionary change in the treatment of ureteral calculi. Some years ago the choice lay between a policy of waiting for spontaneous passage or operative removal. The development of cystoscopic technique, however, and the various additions to the cystoscopist's armamentarium by such men as Lewis, Buerger, and others have completely altered the situation. Patients now seen in their early attacks where calculi are small are advised to play a waiting game, provided of course there are no unusual complications, and many of them pass their stones without much difficulty. For the others, where the stone has evidently become caught in the ureter and bids fair to hang at any point, cystoscopic manipulations to aid passage are begun and, if patiently carried out, are rewarded with a high degree of success. Operations are relegated to the last position, to be undertaken only where cystoscopic methods fail or where the condition is an emergent one.

Twenty-three patients of our series have remained under cystoscopic treatment until either the stone was passed or else we decided that our manipulations were futile. Cystoscopic efforts were successful in twenty-one of the twenty-three cases. Of the two failures, no progress had been made in one after some seven treatments and the stone was therefore removed by operation. In the second case, presenting a very low stone and a heavy infection above it, there was retrograde migration to the kidney probably during a quite severe reaction following the third dilatation. The calculus was later removed from one of the middle calices.

In these cystoscopic treatments we have employed the usual bougies, catheters, scissors and dilators of different types. The preliminary instillation of a little four per cent cocaine solution at the site of the stone has seemed to help materially in lessening pain and, by decreasing spasm, has rendered much easier the passage of an instrument by the obstruction. Olive oil has been injected freely for lubrication, primarily for the entering instruments and secondarily for the stone coming out. We prefer, if possible, to get two or more bougies or catheters by the stone and so

far this procedure has seemed more valuable than any other. As a rule, bougies have been left in position for twenty-four hours and have then usually come away with a marked drag, probably bringing the stone down into the grasp of the duct below the old point of lodgement and thus into a position where the expulsive efforts of the ureter could be more effective. The Lewis dilator has been used at least once in practically all cases. In one patient, a stone caught first at the orifice was readily freed by incision of the meatal lip with scissors.

The average interval between treatments has been about ten days. More than three treatments have been required in only three patients, viz., four, six and eight. The calculi have been situated in the lower portion of the ureter in twenty of the twenty-one successful cases. It is quite probable that a fair number of the stones would have been expelled without any instrumentation. Eleven of the twenty-one patients, however, had had attacks of colic for eight months or more, fifteen for more than two months. Only six were seen within ten days of the first attack of renal colic.

Sixteen patients of the whole series have come to operation. Immediate surgical attention was demanded only in the case with a ruptured ureter and extravasation of urine. Operative procedure here was limited to extensive extraperitoneal drainage. An entirely extraperitoneal ureterotomy was done in seven cases. In eight patients the peritoneum was first opened, the stone located, milked upward if possible, the ureter exposed with the aid of a hand within the abdomen, the peritoneum closed and the operation from this point carried out as in a primary extraperitoneal exposure. Opening the peritoneal cavity has been time saving, certainly where the calculus was deep in the pelvis. In all operations the ureteral incision has been sutured and we have found it distinctly helpful to place the sutures just after the duct has been incised upon the stone, but before the stone was lifted out. Routinely the ureter was dilated at and below the point of stone lodgement.

The average duration of hospital convalescence in these operative cases was twenty-four days. There was no leakage of urine in eight cases, some leakage in four, data as to this feature was lacking in the remaining histories.

The one post-operative complication was a femoral thrombosis followed by secondary pulmonary infarcts.

There was one operative death. This occurred in a woman with marked argyria, fifty-eight years of age, who presented an infected hydronephrosis due to a stone in the mid ureter. Because of her poor condition, a rubber tube was first placed to the kidney through the flank but did not drain well. Her temperature continued high and the stone was removed in the hope of securing better drainage. No improvement resulted and the patient died some six days later.

We have received reports from eleven of the twenty-one successful cystoscopic cases and none of those reporting have had further trouble. Thirteen of the fifteen cases surviving operation have reported. Nine have had no trouble since leaving the hospital, four have later passed stones.

In conclusion, the analysis of this case series justifies emphasis of the following points:

1. The urine, X-ray findings, and type of pain may be quite misleading in ureteral stone cases. Where there is even a remote possibility of a stone being present, complete urological study is demanded.

2. Cystoscopic manipulations should receive a thorough trial in uncomplicated cases of ureteral calculi before recourse is had to operative removal.

PAPILLARY ADENOCYSTOMA OF THE PANCREAS.*

By GEORGE TULLY VAUGHAN, M. D., LL. D., F. A. C. S.,
Washington, D. C.

It seems that infections of the pancreas occur more frequently than cysts or neoplasms. Carcinoma is the most common of the new growths. In 11,472 necropsies, Segre found 127 cases of carcinoma and two of sarcoma. Hale White found one case of sarcoma in 6,708 necropsies. According to Deaver and Pfeiffer, carcinoma is the most common tumor of the pancreas, forming one per cent of all cases of carcinoma. The secondary are more frequent than the primary, coming from the stomach or biliary passages—ten per cent of gastric carcinomas extending to the pancreas—while the most common benign tumor is the cystadenoma.

Various forms of cyst may occur, as reten-

tion cysts, cysts from inflammation or hemorrhage, hydatid cysts, malignant cysts, and congenital cystic disease.

A cystoma is a neoplasm in which cysts make up some part of its structure. Such tumors are found frequently in the ovary and breast but rarely in the pancreas.

According to Ziegler the papillary adenocystoma constitutes a common variety of cystadenoma. "It is characterized by the fact that *papillary* excrescences develop in glands which have undergone cystic dilatation. In the ovary or breast such excrescences are usually slender and delicate, forming villous-like or cauliflower elevations which fill a larger or smaller part of the cysts. Larger papillae are always more or less branched and consist of a cellular stroma whose surface is covered with tall cells of the character of goblet-cells. The contents of the cysts consist of ropy mucus mingled with desquamated cells which have undergone mucous degeneration. Papillary adenocystomata show a certain degree of malignancy."

Haubold (*Princ. and Practice of Surg.*) says "Proliferation cysts of the pancreas are usually multilocular . . . and pathologically two types are recognized, the benign cyst-adenoma and the cystic epithelioma which is malignant. In many instances the clinical course is the determining factor as to the malignancy of the growth, it being often difficult histologically to differentiate between them.

Kemp (*Dis. Stom. Intest. and Pancreas*, 1917) says that among the true cysts of the pancreas we have retention cysts and proliferation cysts or cystic neoplasms. The latter are cystic tumors due to spontaneous proliferation of the epithelial elements of the gland with accumulation of fluid in the cavities so formed, and may be simple or malignant. Proliferation cysts or cystic neoplasms are characterized by irregular gland-like growths below the epithelial lining of the cyst and by the presence of papillary projections from the cyst lining. Sotti, under the name of adeno-cystoma papilliform, describes a tumor of the pancreas with metastases in the lymphatic glands and lungs.

About 173 cases of operations on cysts of the pancreas have been recorded (1917).

Partial extirpation of the pancreas has been carried out, according to Glaessner, twenty-eight times with fourteen operative recoveries and fourteen deaths.

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My case is as follows:

Mrs. W. C. C., white, 64 years old, had an ovarian cyst removed twenty years ago—the nature of the cyst is not known. For several years has been troubled with “indigestion.” About ten days ago she was taken with severe pain in the right hypochondriac region, chills, fever, and leucocytosis of 14,000. No jaundice but cholecystitis was suspected at the time. When seen by me with Dr. Crosson, her pulse was running from 80 to 120 and temperature from 99 to 102, leucocytes 14,000. There was no diarrhea or glycosuria. There was slight fullness and tension in the epigastrium and tenderness which extended clear across the abdomen. The diagnosis was tentative; ulcer of the stomach or duodenum, cholecystitis, pancreatitis, or appendicitis.

At the operation slight adhesions were found about the liver, gall-bladder, and stomach, and a mass in the head of the pancreas behind the duodenum. On account of its intimate adhesion to the descending duodenum and the numerous blood vessels, the mass was opened through the duodenum by an incision through its anterior wall, and a small incision through the posterior wall directly into a cavity in the mass from which about a teaspoonful of tissue looking like granulation tissue was scooped out. On passing the finger into this cavity, a second cyst was broken into from which the same kind of material was scooped out.

The incision in the anterior wall of the duodenum was then closed, but the one in the posterior wall communicating with the cyst cavities was left open. The gall-bladder and ducts seemed normal to palpation. The abdomen was closed without drainage.

The patient became delirious in a few days, with irregular heart action, then coma set in and death five days after operation, perhaps from acidosis.

The fragments of tissue removed were examined by Dr. Neuman and pronounced papillary adenoma.

1718 I Street, Northwest.

THE GATEWAY OF DIGESTION.*

By M. O. BURKE, M. D., Richmond, Va.

Embriologically the mouth is not a part of the gastro-intestinal canal, and in the early development of the foetus the mouth is separated from the canal by three membranes.

The gastro-intestinal canal is derived from the primitive gut (the fore-gut, mid-gut and hind-gut) which is formed by the infolding of the hypo-blast.

“The buccal cavity is formed from the external (the epi-blast) layer of the blastodermic membrane, which passes inward and meets the pharynx or upper part of the fore-gut. The two cavities are, however, at first completely separated from each other by all the layers of the blastoderm, but at an early period of development a vertical slit appears between them: this gradually widens and becomes the opening by which the common cavity of the nose and mouth communicate with the pharynx.”

The mouth is a complex and a compound organ: complex in that it is made up of various parts linked together; compound in its ultimate object of aiding digestion. The lips hermetically seal the opening of the mouth when necessary; prevent air from entering and saliva from escaping; is especially useful in retaining food during mastication, and in protecting the teeth and preventing the mouth from becoming dry.

The teeth are of three kinds—the incisors for cutting, the canine for holding and tearing, and the molars for grinding. The tongue is for tasting, testing the consistency, mixing the food with saliva, changing the mass from side to side, and finally for carrying the mass back into the pharynx and assisting in deglutition. The sense of touch is more highly refined in the tongue than any other part of the body. The salivary and mucous glands are for keeping the mouth moist, moistening the food so it can be swallowed, digesting a part of the starch, and secreting an antiseptic. The mouth is a *mill* for grinding food, a *mixer* and a *stoker*. In many of the lower animals it is also a *harvester*.

The saliva must possess some healing properties as manifested by lower animals in always licking their wounds and sores. Yet we know that the saliva of man and beast is often a powerful poison. It is said that the bite of a blue gum negro is as poisonous as the fangs of a rattlesnake.

A mouth may be clean and pleasant to inspect, but some are veritable cess pools. When we stop to think that the pleasure of eating is in the mouth and that all of our food passes through the mouth, we are forced to realize the importance of keeping the mouth clean.

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The mouth does not absorb food or water but some drugs and poisons can be taken up by the membranes of the mouth.

The digestive functions of the mouth are preparatory rather than complete. We sometimes feed patients through a stomach tube. If we had no mouth or only an exposed pharynx, all food would have to be especially prepared and we would be deprived of the pleasure of eating.

The three preliminary acts are mastication, insalivation and deglutition. Insalivation and deglutition depend largely upon mastication. All vegetable and animal food is composed of cells. The cells are surrounded by capsules or cell membranes. The capsule must be broken or removed before the digestive juices can produce the chemical change necessary for absorption. Heat and moisture are important elements in the rupture of the capsules; saliva furnishes moisture and a chemical that aids in the dissolution of vegetable capsules; mastication increases the flow of saliva and the grinding process should aid in breaking some of the capsules. An enormous amount of work is done each day by the mouth. It has been estimated that the daily pressure exerted by mastication amounts to about 1,700 pounds.

When food is properly cooked, we find the cells swollen and nearly every capsule broken. When improperly cooked the cells are shrunken and the capsule unbroken and often surrounded by a moat of grease. Such food is necessarily hard to digest and must depend upon the chemical dissolution of the capsule before the cell can be reached. Food that is slightly masticated is difficult to swallow and requires extra time and effort for the digestive secretions to penetrate the masses. Mastication is very essential to good digestion. Sound teeth and a healthy mouth are necessary for mastication.

Good digestion and a healthy mouth are important to good health. The mouth is frequently the starting point of grave diseases. Rosenow has shown that streptococci from various organs have an affinity for the same organ when injected into the circulation of another animal. Can we not expect to find a similar embryological condition in the human body? A focal infection in the blastodermic derivatives is more likely to produce trouble in organs or tissues derived from the same membrane.

"It has been proven that the mouths of all

adults and most children contain bacteria," but it does not follow that every individual is infected by these bacteria.

The skin and mucous membrane are immune to bacteria so long as there is no break in the continuity or the presence of material to act as a culture media. The membrane may be healthy and its continuity intact and still support a deposit on which bacteria may propagate. Some bacteria generate a toxin which may destroy the membrane and thus gain an entrance. Even then the bacteria may be destroyed by the white cells and plasma of the blood.

The importance of dental prophylaxis is emphasized by Keyes' observations in an Orphan Asylum, where the percentage of infectious diseases was reduced fifty per cent at the end of six months and to approximately two per cent during the following year.

During the last decade, infant mortality, typhoid fever, deaths from tuberculosis and diphtheria have been greatly reduced. The average life span has been increased about twenty years, but the death rate from forty-five to sixty-five is greater than ever before. Nephritis, heart disease and arteriosclerosis have claimed most of the victims. Focal infection of the mouth has been found to be a frequent cause of these troubles. The way we eat and the way we live may account for many more.

204 East Franklin Street.

THE CHRONIC PATIENT.*

By R. L. RAIFORD, M. D., Sedley, Va.

The biggest question which faces the medical profession today is the "Chronic Patient." The wonderful strides made in surgery in recent years have been the marvel of the ages for attainment, and have placed this branch of medicine in a position of distinction of which we may well be proud. Such men as Pasteur, General Gorgas, Dr. Reed, and Stiles have gained undying fame in the realm of communicable diseases. The abdomen and other forbidden parts of the body are now explored and treated with impunity. The once dreaded swamp and morass have long since become virtual garden spots and so safe for health that their fertile soils are inviting settlers from the far corners of the earth. Thanks to vaccine and the passing of the stegomyia, no longer is

*Read before the fifty-fourth annual meeting of the Medical Society of Virginia in Roanoke, October 16-19, 1923.

mankind harassed by the scourges of smallpox and yellow fever, and diphtheria has been robbed of much of its terror by the early and scientific use of antitoxin. The teaching of sanitation and cleanliness has been instrumental in hurrying such diseases as typhoid and the serious diarrheas of infancy down the long road of the dodo and the mastodon. School inspections and free clinics are fast placing in the reach of everybody the chance to prevent or have treated most acute diseases of childhood or adult life, and the triumph of skill has lessened the terrors of serious wounds and injuries. The wild cry of "Mad Dog" from a scared populace is well-nigh forgotten to the youth of today, and the horrors of the Great White Plague are rapidly being dispelled by its early recognition and treatment on the part of the physician and the healthful co-operation to this end on the part of the patient.

The modern physician can conscientiously and with the satisfaction of the knowledge of hard fought battles of science and well earned laurels of achievement swell out his chest and point to these and many other singular and most worthy advances in the early and accurate diagnosis and most commendable treatment of a very large per cent of the acute diseases to which human flesh is heir, but when we turn to the "Chronic Patient" we have only to observe the pompous display of ill-gotten gain and wealth of the quack and the charlatan to read in these facts the sad story of our own inefficiency and failure to properly diagnose and treat this group of unfortunate patients.

We will assume as an undisputed fact that the average sick person first seeks the aid of a regular practitioner of medicine and it is only after failure to get the relief sought for here that he is finally induced by the flattering promises of the irregular to seek aid from this source.

We will, therefore, assume further, as a foregone conclusion that, cuss the quack as we may, legislate against him in the most severe manner possible, the indisputable fact still remains that so long as we, as a profession, fail to recognize and cure the ailments of the chronic ambulatory patient, just so long will there be material on which these impostors will fatten and grow rich.

One by one the so-called idiopathic diseases are being stricken from the list. Such terms

as idiopathic peritonitis, idiopathic heart diseases and idiopathic pleurisies no longer have a place in the vocabulary of the modern physician. And yet how we cling with deathlike tenacity to customs old and revered! Only a few weeks ago quite a learned doctor discussed lengthily with me, holding out against any argument I could muster, that both insanity and epilepsy were in the main purely functional and had no real physical cause. He might as well argue that your faithful Ford, without cause, gets cranky at times and will not run properly.

Medicine and surgery were founded largely in an atmosphere of empiricism. The pioneers in this branch of science knew nothing of the modern laboratory methods of checking their physical findings, and yet we must still take off our hats to the splendid accuracy of their deductions. Therefore, rheumatism instead of being of an infectious origin was a diathesis, and malaria instead of being due to a parasite was of a miasmatic nature; and such fallacies were common all along down the line of diseases. This guesswork in diagnosis was more than eclipsed by a guesswork treatment and nothing was ever exact. The consequence is that men who still practice empirical medicine get on fairly well with acute diseases which are quickly over. Here, nature, with a little expert assistance, will make a cure in a large per cent of cases and the attending physician often gets the credit for doing more than he has really done. No matter if he has made a slip and called typhoid, malaria, or a mild scarlet, roseola, so long as the patient recovers promptly, little harm in the individual case is done.

Not so, however, with the "Chronic Patient." Here, nature has for a long time been making a supreme effort to restore the disabled organism to normal, but some hidden chronic infection of an obscure nature is continually pulling down as fast or faster than she can rebuild. Neither does the over lauded medication which gets so much undue credit in the self-limited diseases help us much more with our chronic patients. The consequence is that we flounder around, first using one much vaunted remedy and then another until we lose confidence in ourselves and our patients lose confidence in us; so that the desire to change to another doctor or even a quack is welcome news to us. The outcome of it all is that we get disgusted with such inexact haphazard

methods of diagnosis and treatment and this, perhaps, accounts for so many good men laying down their profession for the business world.

But the light of a new day is dawning and, when it opens up in the full radiance of its noonday sun, we shall no longer guess our diagnoses and apply a fantastic empirical remedy which so frequently does such little even imaginary good. We shall recognize the fact that having eliminated abuse of our systems and an inherited tendency towards certain diseases we have left, trauma and infection to account for the remaining ailments of mankind, and that the most of the high sounding names of diseases to be found in the usual treatises on medicine are in fact merely names for the varying symptoms of some obscure underlying infection which must be rooted out if we will really cure our patient.

The fact is that one of the greatest drawbacks to the advancement of medical science has been this giving of so many names to the same pathological entity. In trying to classify disease according to these names, one often becomes lost in the confusion, making the reading of medicine tiresome and often disgusting, thus, in part at least, accounting for so many men not keeping abreast of the latest advances of the profession.

We must not lose sight of the fact that the primary focus of infection so often gives no local symptoms of pain or discomfort and yet may be the cause of havoc being wrought in some other even distant part of the system. High blood pressure, nephritis, appendicitis, gall-tract infections, heart diseases, indigestions, rheumatic conditions, the various skin diseases, the psychoses and many other so-called diseases so often are due to some obscure infection and are preventable if taken in time or often curable if treated from this standpoint. Who of us are not continually having patients come to us stating that Dr. A pronounced her case nervous indigestion, Dr. B called it a nervous heart condition, Dr. C thought it was simple neurasthenia, but Dr. X was sure it must be gaseous dyspepsia, and so on down the line *ad infinitum*, according to the predominating symptoms when the patient was seen, when a painlessly infected incisor or an impacted molar may have been the true cause of all the category of symptoms?

Preventable medicine is not finished by the

controlling of communicable diseases, however much we may laud this particular branch of work. The restoration of a chronic dyspeptic by the removal of a gall-bladder or an appendectomy, however commendable, does not exclude the fact that these are often or perhaps always only secondary to the real primary cause which should have been corrected in early life.

Proper institutional provision for those unfortunate citizens suffering from the various forms of psychoses is most laudable but, if as being demonstrated by some of the best men of our land, these are just tail-end results of a long-standing hidden infection, we must learn to recognize the earlier symptoms of these infections and by proper treatment prevent the inroads on the mentality of this class of patients. Or, having failed in this, we must still hunt for and root out, where possible, such infections and give these unfortunates the best possible chance to be restored to normal, mental and physical health again.

The surgeon of today realizes that his post-operative infections are not altogether dependent on a rigid aseptic technic. More and more stress is being laid on the preliminary cleaning up of the infections of the teeth, tonsils and sinuses, to the end that it may possibly prevent the need of many major operations altogether and make those that are necessary less hazardous and more beneficial to the patient.

Obstetrical records could also be robbed of many a tragedy had some chronic ailment been recognized and the hidden infection causing it been cleaned up before or even during the pregnancy.

If we, therefore, assume that the average chronic patient who comes to us is ailing from some infection, often obscure and elusive, then the natural deduction would be that to render any permanent benefit we must work towards the end of removing this infection. In order to carry out effectively such a line of treatment, we must necessarily know where to look for such an infection. Fortunately for the diagnostician, the mouth and nose may be considered the primary ports of entrance in a vast majority of cases. Fortunately, too, we may still find the causative infections located in the nose, throat or mouth in a large percentage of our cases, making them comparatively easy to locate and remove. But not finding the offending infection in these sites should not discour-

age us in our hunt for it when symptoms indicate that such an infection really exists. No chronic patient should be considered properly examined until we have at least checked up on the teeth, tonsils, nasal cavities and accessory sinuses, uterus, prostate and rectum, as well as all organs located in the chest and abdomen. Furthermore, having found and cleaned up one or more points of infection without relieving symptoms should not discourage us to look still further for and eradicate other foci, and we should never consider ourselves beaten until we have located and cleaned up every accessible point where hidden germs may be lurking.

In conclusion, let me say that if we pay less attention to empirical medicine and look in every case for a definite cause for the symptoms of which our chronic patients complain, we will speedily find that we will not only get better results but our work will at once become vastly more interesting and give us a feeling of satisfaction we have not experienced before.

A closer study of disease from this angle will convince us:

First: That a very large proportion of all sickness and mortality is chargeable to infections;

Second: That many of the chronic and so-called incurable diseases of middle or late life can be prevented by the early removal of the primary infection, or may even yet be much benefited or often cured by treating them from this standpoint;

Third: That in obstetrical and surgical cases, complicating infections and mortality may be greatly reduced by a closer study and removal of all focal infections, where possible, before operation, and

Fourth: That, by considering the symptoms of all our chronic patients as of an infectious origin, where a given effect is always preceded by a definite cause, we will have made a long stride towards finally and completely rescuing the practice of medicine from an antiquated and long outlawed empiricism and placing it in the forefront among the other exact sciences.

A GOOD GUESS.

The doctor's small son was entertaining a friend in his father's office, and they were looking with awed admiration at the articulated skeleton in the closet. "Where did he get it?" asked the small guest in a whisper. "Oh, he's had it a long time. I guess maybe that's his first patient!"—*Life*.

MAN, THE PHYSIOCHEMICAL COMPLEX. ELECTRICITY AND THE ELECTRON. REASONING AS A CHEMICAL RE- ACTION, RESULTING IN AN ATOM COMPLEX THOUGHT.*

By CHARLES ELMORE BOWLES, M. D., Pulaski, Va.

In presenting a paper of this character it is necessary that I mention numerous accepted theories and recognized facts, derived from the various fields of scientific endeavor, and select those laws under which the particular phase of this most intricate and complex system exist. For no definite conclusions can be reached until definite laws can be applied with equal force to the chemical, biological, physiological, psychological and cosmic processes. I shall follow three definite laws and attempt to show that man and his thoughts are chemical in nature, controlled and developed by the operation of these laws.

1. The law of chemical valences.
2. The law of complexity.
3. The law of attraction and repulsion.

According to the law of chemical valence, certain chemical elements and compounds attract certain other elements, the reaction taking place under the stimulus of a definite form of energy. Through this law we come to understand the behavior of a chemical reaction, and why certain elements enter into the compound, while others in the surrounding are left out. Applying this law to conditions existing in the late cosmic or archeozoic era, when the waters of the cooling globe held various chemical elements in solution, we find conditions ripe for marked chemical reactions to take place and for the chemicals to combine into higher and more complex formulae, each combination attracting or appropriating special types of elements until the compound became so complex and delicate, that further stimulation produced a blending of the elements, one into the other, so that the compound now acts as a single unit or chemical cell. The cell having retained the energy generated by the reaction, thus became endowed with internal motion and the transition from inorganic to organic was accomplished.

Various theories concerning the special elements involved and the particular form of energy appropriated have been advanced but

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all agree that organic sprang from inorganic. That life arises from earth and water, we find to be the opinion of Aristotle and since then the same views have been held by philosophers, poets, theologians and laymen. Lucretius said that all things are produced out of the earth, forming in the rain water and the warm vapors raised by the sun. Ross, in the seventeenth century, said that to question this is to question reason, sense and experience. In the scientific theories of today, we find according to Pflüger, that the cyanogen radical is an integral part of the molecule complex of living protoplasm and that this radical contains a large amount of internal energy, and in this way energetic internal motion is injected into living matter. According to Pflüger's hypothesis, there arose a simple homogeneous material, from which has evolved the highly differentiated protoplasmic mass or cells of organic life today.

Allen says that solar energy, acting on the damp earth containing the raw materials, caused dissociation and rearrangement of the atoms. Then further reaction, catabolic and anabolic, occurred by virtue of the nitrogen compound. This constructive process continued until organic life became manifest.

Osborn asserts that water, nitrates and carbon dioxide, which are known to be essential to the perchlorophyllous and chlorophyllous stages of the life process, were brought together so as to capture and transform the electric energy of the chemical elements, characteristic of protoplasm.

In Moore's theory, we see albumin and silica in colloidal form appearing in solution or suspension in the waters of the cooling globe. These combining with other chemical elements, as the temperature permits, form solution aggregates or complexes, in which the unit of chemical structure passes from atom to molecule. Moore applies the law of complexity to this, that matter, so far as energy environments will permit, tends to assume more and more complex form in labile equilibrium, atoms, molecules, colloids and living organisms, arising as a result of this law. The sensus of opinion seems to be that there was a gradual blending of the elements, until they could no longer be distinguished in the protoplasmic cell.

It is impossible to analyze protoplasm for, in disturbing the fundamental organization, that is, in breaking up the compound, we cause a cessation of those phenomena characteristic

of life, leaving matter in the non-living state before us. Living protoplasm is a colloidal complex, comprising chiefly the elements carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorus, sodium, calcium, potassium, chlorine, iron and magnesium. Certain combinations of these, in the form of carbohydrates, proteins and fats, are distinctly characteristic of protoplasm and are not found elsewhere in nature. The manifestation is clearly a physiochemical complex and its fundamental phenomena is energy. It consists in appropriating energy from its environments and using it to develop higher complexes. One of its peculiarities is its proneness to change its composition under the stimulus of slight changes in the energy equilibrium between itself and its surroundings. By applying the three fundamental laws, chemical valence, complexity attraction and repulsion, we see the chemical or protoplasmic cell appropriating energy and selecting certain chemical elements from its surroundings and gradually developing another compound or nucleus within itself, which is later expelled as a new cell. Finally, through changed conditions and the incorporation of new elements, a new type of cell is developed, which likewise selects elements in accordance to its new valency.

In this way the cells gradually became differentiated into the various tissues and organs of the body, each related but being composed of one or more different elements, therefore having a different function or action, as the chemical reactions or metabolic changes occurred in the body. These facts are very pertinent when we recall that the chemical composition of the body is as follows: Water 66%, nitrogen 3.1%, hydrogen 2.1%, carbon 15.8%, calcium 2.5%, phosphorus 1.2%, oxygen 6.7%, iron, sodium, chlorine, iodine, potassium, fluorine, sulphur and magnesium in varying quantities. The action or function of the various tissues or organs depends upon the particular elements and the proportion of the elements composing them. The muscle contains phosphate of magnesium, potassium, sodium, iron and potassium chloride; connective tissue has silica as its specific substance, while elastic tissue contains calcium fluoride. The bony structure contains calcium fluoride and magnesium phosphate, with a large amount of calcium phosphate. Cartilage and the mucus cells have for their specific inorganic material sodium chloride. This also occurs in

all solid and fluid parts of the body. The hair and crystalline lens have iron and other inorganic substances, while the nerve tissue, which has now become an isolated system, contains phosphate of magnesia, chlorine, sodium, potassium and iron. From this we see that while all the tissues are closely related, yet each contains some specific inorganic substance which causes its function and appearance to differ from that of the other tissues with which it has a common origin.

The brain, the highest type of tissue, not only differs from the other tissues of the body, but the various groups of cells differ from each other, just as the different portions of the internal organs differ, this difference being brought about by the particular chemical combinations forming the cells in each part of the organ, as a result of gradual chemical differentiation.

The brain substance also shows itself to be chemical on analysis, but we must remember that this organ has probably been developing for some 500,000 years or more or since the early Paleozoic era and that Paleolithic man had reached the verge of intelligence. That since that time there has been an ever increasing rapidity in the differentiation of the brain cells. After ages of development, we still find it to contain such substances as lipoids or phosphorus bearing compounds, composed chiefly of lecithin and kephalin. These phospholipins are chemically phosphoric acid in combination with neutral fats and a nitrogenous base, cholin. From lecithin the glycerophosphates are derived, while cholestrol, an alcohol, is also found in the brain. From what has been said, it will readily be seen that any disturbance in the chemical composition or deficiency of inorganic supply, immediately affects the protoplasmic cell, so that its accustomed energy will no longer cause a reaction, and a pathological condition results. The end products of proteolysis, as amino-acids, may be catabolized by bacterial action, with the result of toxic amines. These intering into combinations with the chemicals in the tissues produce a disturbance, so that the cell is no longer sensitive to its accustomed energy. This occurring in the brain tissue produces sluggish or confused reactions. Doubtless man, the physiochemical complex is in reality a delicate and highly developed series or complex of inorganic chemical compounds, which is constantly appropriating energy and elements

and blending them in protoplasmic form, and in which there is ever occurring a vast congeries of chemical reactions.

ELECTRICITY AND THE ELECTRONS.

Dr. J. S. Hughes, of Kansas State College and chairman of the biochemical division of the American Chemical Society, recently read a paper before that society, in which he stated that thought is a chemical process and that nerve impulses are purely electrical energy: that whenever the lipins surround the water in the nerves, they become ready conductors, but if the water surrounds the lipins they are poor conductors. He is now carrying out experiments along this line. To me it seems that the nerve impulses, which are doubtless electrical energy, are conducted by the rapid vibrations and interchanges of the electrons, composing the nerve cells and fiber, and that the electric energy is generated by the chemical change taking place in the protoplasmic cell, just as in the original cell as it passed through the transitional stage from inorganic to organic. The brain cell, being a highly developed chemical complex, and containing certain inorganic elements, undergoes a definite chemical reaction, when stimulated by the electric energy derived from its surroundings. The source of this energy may be a chemical reaction in some distant organ or tissue of the body or other brain cells but, for our purpose, I shall consider only those derived from the organs of special sense as a result of some external impression or psychic phenomena. In investigating energy, we find that certain waves are absorbed and others reflected and the effect on the sense organ is modified by the type, length, duration and intensity of the energy or electronic wave, as demonstrated in Young-Helmholtz and Herings theories of color sensations and the skin reaction in sunburn. The absorbed rays produce a chemical reaction and, when affecting the skin, result in the familiar blister and a change in the valency of the tissue, so that the rays are now reflected and produce no further effect.

The flower placed by the window leans toward the light for the reason that here the direct rays produce a reaction on the side of the plant exposed to the energy and the elements are drawn from the other parts of the plant to supply the needs of the reaction. Therefore, the plant becomes more developed on this side and is drawn over. Some plants

and chemicals develop or react better in low temperature and in these cases the condition would be reversed. The sense organ of sight acts similar to plants, when exposed to direct rays of light, the reaction taking place in the rods, cones and pigment of the retina. The rods become colorless and the pigment increases in color, the light first producing a visual yellow and then a visual white, and, if the length, duration and intensity is sufficient, inflammatory changes occur.

This also applies to the other sense organs, and the organ of hearing probably undergoes a chemical change or interchange of electrons between the endolymph and crystals of calcium carbonate in the capsula. Since we see that there is an actual absorption of energy or electronic waves by the chemical tissues, which results in a reaction, it is necessary that we know the composition of these electronic waves before we can determine the particular reaction and know what result to expect. In order to do this it is necessary that we keep before us the fact that all matter is composed of molecules, molecules of atoms, and atoms of electrons, and that all nature is in constant motion and undergoing chemical changes or reactions. In the reactions, certain atoms and electrons are combined while others are displaced or repelled, just as certain elements are combined and others expelled in forming compounds. This is more clearly explained in the phenomena of osmosis. Here we find that water is a fluid the molecules of which are in constant motion. Pure water has the formula H_2O and these molecules undergo practically no dissociation into their constituent atoms and for this reason it is not a conductor of electricity.

Sugar solutions for the same reason are not conductors.

Solutions of most of the salts, bases and acids, are conductors of electricity, since these substances undergo dissociation and the simpler materials into which they are broken up are called ions. These ions are simply groups of freed electrons. If sodium chloride is dissolved in water, it becomes a conductor, for it is broken up into two electrically charged parts or ions, the sodium ion being charged with positive electricity and the chlorine ion with negative. Solutions of hydrochloric acid contain free positive hydrogen and negative chlorine ions. The term ion is not equivalent to atom, for it may contain enough electrons to form a group of atoms. The negative

charge is equal to the positive charge, but, in the case of sulphuric acid, there are two positive hydrogen ions and only one negative SO_4 ion. Substances which have this property are termed electrolytes.

In a simple electric battery, containing a zinc and copper plate immersed in dilute hydrochloric acid, potential electricity is produced when the acid attacks the zinc and pulls zinc or positive ions into the solution. This gives a positive charge to the solution about the zinc plate, increasing the potential difference and repelling the positive hydrogen ions toward the copper plate, where some of them enter the copper atoms, forcing copper electrons to the next portion of the wire, etc., through the wire. The reduction of the zinc atoms causes the chlorine to be attracted to this pole, where the same interchange takes place between the chlorine and zinc plate. The excess of hydrogen and chlorine is deposited on the respective plates, as is seen in electro plating. When a contact between the wires takes place, the two circuits flow in opposite direction through the wire. Should the wire be applied to tissue, the electrons composing the electrodes would pass into the atoms of the chemicals composing the tissues and, by increasing the atomic weight, convert the molecules into a new element and cause a chemical reaction to occur. That the electrons actually pass from the wire is clearly demonstrated by the experiments of J. J. Thomson, of Cambridge, England, and Perrin, of Paris, in studying the cathode rays. According to Thomson, these cathode particles are the primordial particles out of which the seventy odd atoms known to chemistry are built up. The chief difference between the various atoms of chemistry consists in the number of these particles or electrons which enter into them, the hydrogen atom containing about 2,000 electrons, the oxygen atom 32,000, the mercury atom 400,000, etc.

The number of electrons entering the wire depends upon its composition and the solution used. Copper and zinc in solution of hydrochloric acid produce an electromotive force of one volt. Carbon and zinc produce one and one-half volts, but copper and carbon produce much less than one volt. By changing the solution, we can still further modify the voltage, the electromotive force depending upon the materials of which the cells and conductors are composed. The resistance of materials

varies greatly and is increased directly in proportion to its length and inversely, in proportion to its size. Applying these facts to the nerve tissues, which consist of phosphorus, magnesium, sodium, chlorine, potassium and iron, we find it well provided with electrolites which readily undergo dissociation, with the result that the ions or electrons, by rapid vibration and a series of interchanges, convey the impulse through the nerve fiber and cell to the brain and, entering the atoms of the chemicals forming the brain cells, produce the reaction or reasoning which results in a chemical compound, thought. These facts would lead us to believe that electricity is nothing more than the electrons or ions thrown off or repelled by the chemical reaction or interchange and traveling at the stupendous speed of from 100,000 to 300,000,000 meters per second. When these rapid traveling electrons or ions come in contact with the sense organs and are absorbed by the atoms of the chemicals composing the tissue, the atoms become more complex and an actual increase in weight occurs. This increased atomic weight, changing the valency of the molecule or element, causes the chemical reaction to occur in which other electrons are liberated or repelled. These interchanging through the nerve fiber cause a reaction in the nerve cell, and thus repel ions to which one or more dendrites of the next cell are sensitive, and in this way direct the impulse over a definite root.

In the nerve, as in the wire, whenever the passage of the electrons or current is partly obstructed or resistance increased, there is a piling up of the electrons, and many become liberated or thrown off as heat. Where this occurs in the tissues, the temperature is raised and some of the liberated ions enter into combinations with the chemicals composing the cells, resulting in an atomic compound, thought, in the case of the human brain cell, or muscular action in the case of muscle. These reactions would also liberate certain electrons or positive or negative charges. That this actually occurs is seen by the experiments of Reyman and later perfected by Herman. These investigators, by attaching a galvanometer to two portions of a detached muscle, found that the amount of electric current produced in the muscle could be measured. The energy was the result of the chemical reaction in the muscle, produced indirectly through the nerve or directly by muscular contact. The

stimuli may be chemical, mechanical, electrical or thermal, but in each of these there must be an interchange of electrons, between the stimulus and the tissue for, in the case of a chemical stimulus, the appropriated electrons or ions is the electricity or energy that causes the reaction. The nature of the chemicals in the tissue becomes changed as a result of the increased atomic weight. To illustrate, the hydrogen atom contains 2,000 electrons; then suppose that 30,000 electrons are repelled by the stimulus and absorbed by the hydrogen atom, we would have an atom composed of 32,000 electrons, or oxygen. The compound containing this new element would immediately react and unite with other elements to form a new compound, with the liberation of definite ions. This occurring in the nerve ending would cause a reaction to continue throughout the nerve and at the end of the nerve; the repelled ions would cause a reaction in the brain cell, resulting in a definite atom, sensation or thought. The ions entering the brain cell are the sensations received from the outside world, the atom compound resulting being the implanted memory impression or thought. These ions or sensations, being appropriated by another cell, are grouped together, so as to form a more complex atom, or perception. Likewise the perceptions are grouped or blended to form conceptions, or a still more complex atom. The sensation, perception, conception, etc., probably each affect only one atom of the millions of atoms composing the cell. Later, whenever an exactly equal and like stimulus is applied to the same nerve terminal, another atom becomes changed. This continues, until finally all the atoms in the molecules of the cell become so complex that the molecules become changed into new elements. The positive or negative sign of the molecule is thus changed, so that the sensations or ions from the stimulus are now repelled. There is virtually a damming back of the ions or current in the nerve, until the sign of the sense organ becomes changed, or the poles of the magnet reverse. At this point we fail to receive or are not conscious of further sensations or ions of the same kind, since electrons of like kind repel each other. Electrons of the opposite sign would now be necessary, in order to produce a further sensation or reaction. This doubtless explains why we become insensible to our surroundings or

definite forms of stimuli and yet react to others.

In the above illustration, we changed the composition of the tissue from positive to negative elements by the addition of psychic energy or negative electrons. Applying this theory to any of the special senses, it can readily be demonstrated that fatigue, sleep, or a change to the opposite sign is produced in direct proportion to the type, duration and intensity of the stimulus or electronic application. Fatigue is a partial saturation of the elements with ions of the opposite sign and sleep a greater saturation, the waking phase occurring when some of the molecules become changed and attract ions of the opposite sign. Death probably results from an intensification of the same process or the disintegration of the complex.

As a physiochemical complex, conforming to the same laws that govern the universe, man must react and develop whenever the electrons, sensations or impressions from the outside world are absorbed by the atoms composing the molecules of the tissue cells. To summarize:

Man is a chemical complex, reacting under the influence of definite forms of energy or ions.

Energy or electricity consists of definite groups of electrons or ions.

Chemical elements are converted into higher elements and caused to react by appropriation of energy or ions.

The ions appropriated by the brain cells in the association centers are what we term sensations and the grouping of these sensations or ions into perceptions, conceptions, etc., form more complex atoms and finally new chemical elements.

Our surroundings, whether appropriated through sight, hearing, taste, smell or feeling, become a part of us and, increasing the atom complex, result in a chemical reaction.

Psychic energy actually produces chemical elements and reactions in the brain and body on man.

DISCUSSION.

DR. L. G. PEDIGO, Roanoke: Because we do not discuss it, we do not wish Dr. Bowles to think the paper was not appreciated.

One idea set forth by Spencer is that all progress evolves differentiating homogeneous bodies of complex, and all papers are based upon the current idea in this line of investigation that nerve force and electricity are identical. Personally, I do not believe

this. They are indestructible, but if we investigate the dynamic relation of nerve forces to various insulating, conducting areas, we find a great difference.

DR. BOWLES, closing: Dr. Williams asked if it was a known fact that the electrons produced a chemical change in the brain? It is not a known fact. The paper is based upon the experiments of J. J. Thompson, of Cambridge, and Perrin, of Paris, with cathode rays. Thompson found that the cathode rays are deflected by a magnet or electro static charge, as was to be expected if they were negative charged, and Perrin proved that they actually imparted negative charges to the body on which they fell. The X-rays are not deflected by a magnet or by electro-static charges and do not carry electric charges. On this ground, Thompson formulated the theory that these cathode particles are the primordial particles out of which the seventy-odd atoms known to chemistry are built up, the difference between the various atoms consisting in the number of these particles.

Applying this to the chemical body and brain, it seems only logical to conclude, that when a sensation, ion or electric charge, reaches the brain cell it is deposited in the atom, as one of the sensations producing perceptions, conceptions or a more complex atom or thought. I am now carrying on a few experiments along this line, following the principle that the electrons or ions actually pass through the wire and by using various cathodes of different materials, hope to inject these substances into the body.

CHORIOANGIOMA: REPORT OF A CASE.*

By R. M. PAGE, M. D., University, Va.

Mrs. J. M., a primipara, 28 years of age, was admitted to the University of Virginia Hospital, March 4, 1922, and was delivered the same day of a male child. It was a normal baby and there were no birthmarks. It weighed 2850 gm. Labor was spontaneous and at term. There was a normal amount of bleeding. The placenta was expressed 20 minutes later without difficulty.



Fig. 1—Chorioangioma. From above.

On examination, this appeared normal except for a dark red tumor about 8 cm. in diam-

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eter presenting on the foetal side. The measurements of the placenta were 19x12x2 cm. The whole was hardened in 10% formalin. On section after hardening, the tumor was found almost spherical and approximately 6 cm. in diameter. It was darker in color and more spongy in consistency than the normal placental tissue. It was separated from it by a well defined capsule. The membranes which covered it on the foetal surface were smooth and glistening.

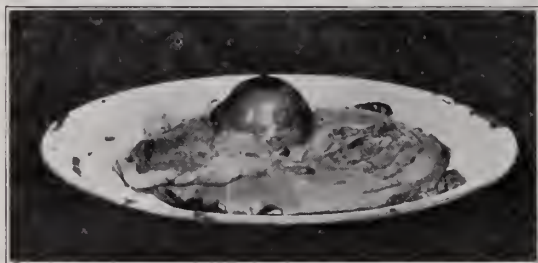


Fig. 2—Chorioangioma. Side view.

The following is the microscopic report by Dr. W. E. Bray of the University of Virginia Clinical Laboratory:

"Sections show a placental tumor undergoing marked regressive change, situated in the membranous portion of the chorion. The tumor consists of numerous blood capillaries, varying in size and shape and containing blood of fetal type, with many nucleated red cells, a few of which are in mitosis. The capillaries are lined by flattened endothelium, but owing to the hyalinization about the capillaries, many of the lining cells are not seen. No mitoses are seen in these cells. There is only a moderate amount of stroma, which is



Fig. 3—Chorioangioma. Section through.

of the embryonic connective tissue type. At the margin of the tumor there is a band of loose connective tissue which is relatively free from blood vessels, forming a thin capsule and separating the tumor from the trophoblast.

"There is marked hyalinization of the

stroma, especially about the capillaries, and this is so marked toward the center that the stroma takes a diffuse acid stain.

"*Diagnosis*: Chorioangioma (capillary hemangioma), with hyalinization of stroma."

There are approximately 100 cases of tumor of the placenta on record. The majority of these belong to the group of hemangiomata, of which this case is an example. As noted by Williams,[†] there is very little to be found on this subject in American medical literature. Williams' article has a pathological description by Mallory and is illustrated.

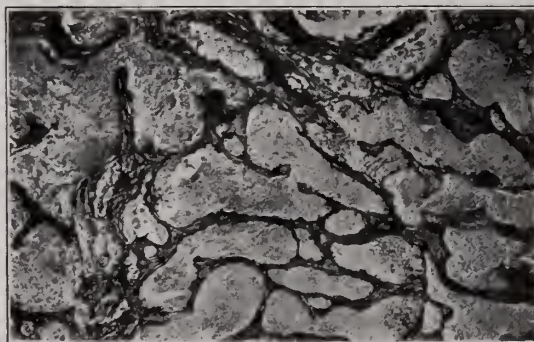


Fig. 4—Chorioangioma. Microphotograph x 75.

This case is reported on account of its rarity. From the reports in literature, about half of the cases were associated with some complication of pregnancy or parturition but, on account of their infrequent occurrence, they are insignificant as causes of these complications.

[†]Williams—Angioma of the Placenta Surgery, Gynecology and Obstetrics, February, 1921, Vol. XXXII, pp. 523-526.

ETHYLENE-OXYGEN ANESTHESIA:

A Report of 116 Anesthesias.*

By J. S. HORSLEY, Jr., M. D., Richmond, Va.

Ethylene is an unsaturated hydrocarbon (C_2H_4) and is found in nature as a constituent of coal gas. At ordinary temperatures and pressures it is a colorless gas having a peculiar ethereal odor and a somewhat sweetish taste. It can be prepared by heating a mixture of sulphuric acid and ethyl alcohol. It has been used commercially in a more or less pure form for several years for heating, lighting and welding.

The anesthetic properties were first observed and studied by Crocker and Knight of the Hull Botanical Laboratory of the University

*Read before the Richmond Academy of Medicine, February 12, 1924.

of Chicago in 1908. Their investigation was brought about by an attempt to discover the cause of large losses sustained by carnation growers shipping their products into Chicago, who found when these flowers were placed in greenhouses they would "go to sleep," and buds already showing petals failed to open. Their study of the effect of illuminating gas, of which ethylene forms approximately four per cent, on flowering carnations, showed that ethylene was the chief constituent which determined the toxicity of the gas for plants. ". . . One part of ethylene in 2,000,000 parts of air caused the already open flowers to close, on twelve hours' exposure, whereas one part in 1,000,000 prevented the opening of buds already showing petals." (Luckhardt & Carter). Because of these effects of ethylene on plants, Luckhardt started his investigation of the toxicity of ethylene for animals. We are indebted to Dr. Arno B. Luckhardt, Associate Professor of Physiology at the University of Chicago, not only for the discovery of ethylene as a gas anesthetic, but also for his scientifically thorough experimental and clinical work which is making its universal use safe and possible. The introduction of no other general anesthetic has ever been accompanied by such general satisfaction and such a low incidence of accidents and complications.

In August, 1922, Luckhardt and Carter, of the University of Chicago, completed their work on the physiologic properties of ethylene gas on laboratory animals, which work has since been confirmed by Brown, of Toronto. Nine months later they reported the first 106 cases in whom operations had been performed under ethylene-oxygen anesthesia at the Presbyterian Hospital, Chicago. Up to the present time there have been no other published reports of cases of ethylene-oxygen anesthesia except those of Luckhardt and Lewis, who reported 800 cases performed at the Presbyterian Hospital, Chicago; Brown, of Toronto, who briefly mentions a few cases; and Lundy, of Seattle, who reports its use in four infants. A good many other clinics, such as the Mayo Clinic, are using this anesthetic and verbally report its satisfaction.

October 9, 1923, Dr. Luckhardt first demonstrated ethylene-oxygen anesthesia in Richmond by having the anesthetist of St. Elizabeth's Hospital anesthetize him. Following this very personal demonstration, the first

ethylene anesthesia in Richmond for operative procedures was given under his supervision. That night before the Richmond Academy of Medicine he again had his personal demonstration of ethylene, as most of you recall. Since that time, with the exception of a short period during which our ethylene supply was out, we have been using ethylene-oxygen as our routine anesthetic instead of nitrous oxide-oxygen and ether which we had previously used.

This preliminary report of 116 consecutive anesthetics of ethylene-oxygen anesthesia at St. Elizabeth's Hospital, Richmond, Va., largely confirms the clinical observations of Luckhardt and Lewis. Of these 116 anesthetics, 6 were inductions for ether, 15 were ethylene-oxygen and ether combined, and 95 were straight ethylene-oxygen.

PRE- AND POST-OPERATIVE MEDICATION.

The usual pre-operative routine of "no breakfast, soap suds enema and $\frac{1}{4}$ grain of morphin sulphate with $\frac{1}{120}$ grain of atropin sulphate given $\frac{1}{2}$ hour before operation" was followed in nearly all of these cases. This was done in order to obtain a fair comparison with the nitrous-oxide-oxygen and ether anesthetics which had gone before. With ethylene anesthesia, morphin seemed to be a distinct aid in the production of the anesthetic state, and atropin seemed to be unnecessary, as there was no excessive mucus or moisture of the respiratory tract which occurs with ether. Most of the cases, with the exception of those following operations upon the gastro-intestinal tract, carried out the customary post-operative orders of "flat in bed, $\frac{1}{4}$ grain of morphin sulphate every four hours s. o. s. for 24 hours, hot or tap water ad lib.," and had weak tea or fruit juices begun in small quantities after 24 hours.

INDUCTION.

The ease and rapidity with which anesthesia was induced was very striking. The absence of struggling and excitement was usually marked. Only three patients out of 116 anesthetics struggled during the induction period. These were robust men of questionable alcoholic history, and were extremely nervous just before the anesthetic was started. Unlike nitrous oxide-oxygen and ether, ethylene produced a sense of well-being and comfort, and a feeling of "fading away," and lacked the

whirling, pounding, frightening sensations which so commonly accompany ether, and to a less extent, nitrous oxide inductions. The average time for induction was 2.3 minutes; the shortest $\frac{1}{2}$ minute and the longest 5 minutes.

RELAXATION.

Relaxation was not as complete as with ether, and more complete than with nitrous oxide. Relaxation was found to be satisfactory in *all* types of operations outside of the peritoneal cavity. This included amputation of extremities, radical amputation of the breast, rib resection, nephrectomies, vaginal and rectal operations, thyroidectomies, neck dissections, nerve and tendon suturing, prostatectomies (perineal and suprapubic), etc. Except in unusually muscular and robust young adults relaxation was satisfactory in all intra-peritoneal operations of the lower abdomen. In 34% of the upper abdominal operations relaxation was complete enough to permit operation; in the remaining 66% relaxation was unsatisfactory, and ether had to be used during a part of the operation. Even in the latter cases ethylene anesthesia was an advantage for much less ether had to be used and then only for about half the period of anesthesia. Two resections of the colon, 1 pylorotomy, 2 gastro-enterostomies, 2 cholecystectomies, were done with perfectly satisfactory relaxation.

COLOR

The color of the patients approached nearer the normal than with any of the other general anesthetics. Cyanosis was strikingly absent. The skin was usually pink and occasionally almost a cherry red. When cyanosis developed, the anesthetic was being improperly administered.

SLOWING OF PULSE RATE.

The average pulse rate before, during, and at the close of the anesthetics was carefully noted, and a slowing of the pulse was found to be a characteristic of ethylene-oxygen anesthesia.

A pulse of 120 per minute before operation would drop to 90 per minute as the patient became relaxed, and would remain there. Some drops were more and others less marked, the pulse usually approaching and maintaining its normal rate for the individual while at rest. In very severe and prolonged operations the

pulse rate rose toward the end, but no case was noted where the pulse rate increased when the nature of the operation itself did not account for the increase.

ABSENCE OF RESPIRATORY IRRITATION.

Excessive secretion of saliva or mucus did not occur with ethylene. In 116 anesthetics, there was not a single case of post-operative respiratory complication which could be attributed to the anesthetic. Patients with mild acute pharyngitis, coryza or bronchitis upon whom we used to refuse to operate, at least temporarily, were given ethylene-oxygen anesthesia and in no case was the condition made worse. The two cases of active pulmonary tuberculosis gave no evidence of extension or irritation of the process following major operations under ethylene-oxygen anesthesia.

ABSENCE OF SWEATING.

Two very important factors in the production of surgical shock are the loss of body fluids and chilling. Every one is familiar with the marked diaphoresis accompanying ether and, to a less extent, nitrous oxide anesthesia. This condition of the skin promotes chilling, a fact which is important not only as one of the causes of surgical shock, but also as a factor predisposing to complicating respiratory infections. A dry, warm skin was a striking characteristic of ethylene anesthesia. Sweating did not occur when the anesthesia was smooth and properly given.

Oozing.

In some cases there seemed to be a slight increase in the oozing while ethylene was being given. This fact, however, has not led to any poor results or complications.

RAPIDITY OF RECOVERY.

The rapidity with which patients recovered from ethylene-oxygen anesthesia was quite striking. By recovery, I mean the length of time from the moment the anesthetic was stopped to the time the patient recognized persons and answered questions sensibly. One patient recovered in $2\frac{1}{2}$ minutes after an anesthesia of 2 hours and 28 minutes. The average time for the patient to become rational after the anesthesia was stopped was 1.7 minutes; the shortest $\frac{1}{2}$ minute, and the longest 7 minutes. The margin of anesthesia for ethylene was narrow and that occasionally

made it rather difficult to give smoothly. When the anesthesia was lightened too much, the patient would suddenly partially wake from a peaceful sleep and frequently swallowed or gulped, or made some spasmodic movement of the abdominal muscles. Manipulations about the diaphragm when the patient was not deeply anesthetized often brought on these movements which largely explained the poor relaxation in operations upon the upper abdomen.

POST-OPERATIVE NAUSEA AND VOMITING.

The causes of post-operative nausea and vomiting are numerous. The anticipation of the operation, the administration of morphin, the operation itself, and the effects of the anesthetic, all are important factors in the production of these very disagreeable symptoms. It was fairly common to have patients retch and spit up some clear fluid as they reacted. Thirty-seven per cent of our cases did this. Most of them did not remember this seemingly unpleasant occurrence. Nausea and vomiting were less following ethylene anesthesia than following any other general anesthetic in our hands, moderately less than nitrous-oxide-oxygen and decidedly less than ether. Vomiting of one or more times occurred in 39% of the patients following ethylene.

Two of the very nervous female patients complained of brief "fainting spells," sometimes accompanied by nausea.

POST-OPERATIVE "GAS."

The occurrence of post-operative intestinal "gas" was strikingly low, and no case developed the marked and obstinate distention, not so infrequently encountered following ether. "Gas" was a discomforting feature in 20% of the cases.

SAFETY.

Luekhardt and Carter have shown that when ethylene gas is pushed to the limit in dogs, the respiratory center fails first, and at a time when the force and frequency of the heart are quite normal. Artificial respiration quickly restores the animal. Death from nitrous-oxide-oxygen is sudden and caused by cardiac syncope, the patient rarely, if ever, being resuscitated. The longer nitrous-oxide-oxygen anesthesia is kept up, the more dangerous it becomes. For these reasons alone ethylene is much safer as an anesthetic than is nitrous

oxide. No latent after-effects were noted. The study of post-operative urinalyses, kidney functions, blood counts, blood smears, hemoglobin determinations, etc., showed no evidence of any form of deleterious post-anesthetic change. The oldest patient was 79 years and the youngest 5 years old.

CONCENTRATION OF ETHYLENE.

Forty-seven of the 116 ethylene-oxygen anesthetics were given by the Ben Morgan machine. This is primarily an ether machine which uses a gas as an induction anesthetic. The gas part of the apparatus simply consists of connections for the smaller size gas cylinders with a rubber re-breathing bag which in turn connects with a mask with an adjustable valve outlet. No accurate determination of the percentage of the gases used can be had with this machine, as the gas bag is filled only by the hand screws of the cylinders. Roughly it was thought that about four parts of ethylene to one part of oxygen was used. Incidentally, ethylene was found to be an excellent gas for an induction anesthetic for ether. It was superior to nitrous oxide, as may be judged from its properties and actions which have already been touched upon. The remaining 69 cases were given ethylene and oxygen with the Model G McKesson gas machine. It automatically feeds the gases from the cylinders into rubber bags where the desired pressure is kept constant and the gases are administered to the patient in known percentages. By means of this more accurate check a smooth and safer anesthetic could be given. It was found that the average percentage of ethylene necessary to maintain surgical anesthesia was 82%, and varied from 75% to 90%, according to the age, type of individual, and the depth of anesthesia or degree of relaxation desired. After about five minutes the patient became more relaxed and towards the end of a prolonged anesthetic a lower percentage of ethylene was required to maintain a deep anesthesia than was required earlier after induction. We have not used ethylene as a re-breathing anesthetic. We hope to report more fully on this factor in a subsequent paper.

EXPLOSIBILITY.

In the presence of oxygen, ethylene forms an explosive mixture, when brought in contact with a free flame. Brown claims that the

mixture having the greatest explosibility is one containing fifteen times as much oxygen as ethylene, so that with an ordinary anesthetic mixture the explosive action is not great. Luckhardt states that it is not quite so explosive as ether vapor. The electric cautery has been used in 41 of the 116 anesthetics without any trouble, although care is always taken to increase the operating room ventilation temporarily while the cautery is being used and the cautery is never used near the mask nor in operations on the head or neck. Carelessness in this respect may lead to an accident. It would seem, however, to be no more dangerous than ether vapor as regards explosibility.

ODOR.

The odor of the gas is sweetish, somewhat like that of sorghum molasses. Only three patients distinctly objected to the odor. It was unpleasant to some visitors who were unaccustomed to it, but, when inhaled for anesthetic purposes, consciousness was so quickly lost that many of the patients did not remember any odor at all.

OPINIONS OF PATIENTS.

Practically without exception patients who had previously had other general anesthetics stated their preference for ethylene. Voluntary statements of the patients would go somewhat as follows: "Didn't mind it," "Liked it," "Greatly preferred it to ether," "Much better than gas (nitrous oxide)," and others were more or less indifferent toward it.

FAILURES.

We encountered one failure in a series of 116 operations. After five minutes of ethylene-oxygen administration this patient was still partially conscious and would move about. Ethylene was stopped and only after 25 minutes of ether by the open mask method did he become anesthetized. All other patients completely lost consciousness and remained quiet. Thirteen per cent, primarily the upper abdominal cases, failed to give proper relaxation and ether had to be added.

ILLUSTRATIVE CASES.

Amputation of Thigh—Case 1. W. R. L., an Indian man, aged 48, had received five months before entrance an extensive burn of the right leg while lying drunk in front of a fire. Attempts at skin grafting were made

elsewhere, resulting only in marked suppuration and further deformity. He had had a diarrhoea, probably toxic in origin, for several weeks. On admission to the hospital his right leg from the knee down was suppurating and gangrenous, he had the appearance of an extremely toxic person, with marked emaciation, a very definite chronic nephritis and myocarditis, and a partially decompensating heart. Two days after admission his right thigh was amputated at the lower third under ethylene-oxygen anesthesia. Pulse before operation was 118, during 106, and at the close 96; period of induction was 4 minutes; time of anesthetic 34 minutes; time to become rational $2\frac{1}{2}$ minutes. The color was excellent and the skin dry and warm throughout the anesthesia. There was no post-operative nausea, vomiting, gas, or complications. The entire anesthesia in this case was ideally satisfactory.

Cæsarean Section—Case 2. Mrs. S. D. B., a primipara of 37 years, had previously had left tube and ovary removed. On account of the patient's age, marked obesity, and a contracted pelvis, with breech presentation, a Cæsarean section and resection of the right Fallopian tube were done under ethylene-oxygen anesthesia. A normal $6\frac{1}{2}$ pound boy began to cry as he was delivered. During and at the close of the operation the pulse was 100; time of induction was 1 minute; time of anesthetic 50 minutes, and time to become rational was 4 minutes. The color was pink, skin was dry and warm throughout the anesthesia, and relaxation was very satisfactory. There was no post-operative nausea, vomiting, gas or complications.

Excision of Colon and Enterostomy—Case 3. Mrs. E. E. R., aged 46, had previously had twenty-three operations done elsewhere. These operations consisted of cholecystectomy, radical amputation of right breast, operation for acute intestinal obstruction, four rectal operations, three sinus operations, and others. In addition to these troubles, she had become a morphine addict. On account of partial obstruction from extensive adhesions and disease of the colon, excision of the colon and enterostomy was done under ethylene-oxygen anesthesia. The pulse before operation was 110, during and at the close 138. Blood pressure before was 108/70, and after the operation 110/78; time of induction was 3 minutes; time of anesthetic 2 hours and 28 minutes;

time to become rational $2\frac{1}{2}$ minutes. Color was pale pink and the skin was dry and warm throughout the operation. There was no post-operative nausea or vomiting, and slight post-operative "gas." This patient had had the previous twenty-three operations done under ether, nitrous-oxide-oxygen, local anesthesia, and combinations of them, and stated concerning ethylene-oxygen anesthesia, "Best anesthetic I've had." She should be amply capable of judging the value of anesthetics from the patient's point of view.

Appendectomy, Excision of Two Lipomata and Radical Mastoid Operation—Case 4. Mrs. W. L. A., aged 40, had an appendectomy, excision of a large lipoma of chest and one of left hip, and a radical mastoid operation performed at one time by two teams of operators, using ethylene-oxygen anesthesia. The pulse before, during and at the close of the operation was 72, time of induction was 4 minutes, time of anesthesia was 1 hour and 49 minutes, and the time to become rational was 4 minutes. The skin was pink, dry and warm throughout the operation. Relaxation was satisfactory. She had slight post-operative nausea, and spit up a small amount of clear fluid several times during the first eight hours. No post-operative gas or complications were present. The patient stated that she did not mind the anesthetic.

Repair of Vesico-Vaginal Fistula with Three Consecutive Ethylene-Oxygen Anesthetics—Case 5. Mrs. N. S. H., aged 62, had three consecutive ethylene-oxygen anesthetics during a plastic repair of a large vesico-vaginal fistula which was caused by a burn following an over-enthusiastic radium treatment for cancer of the cervix. She had a chronic nephritis, pharyngitis and laryngitis, and was considered a very poor operative risk. The anesthetics lasted 52, 65 and 27 minutes, respectively. They were completely satisfactory followed by no extension of the existing diseases and no complications.

Excision of Large Ovarian Cyst: Patient had Advanced Bilateral Pulmonary Tuberculosis—Case 6. Miss C. S. F., aged 42, had had a long-standing advanced bilateral pulmonary tuberculosis. For several weeks previous to entering the hospital she had given symptoms of partial intestinal obstruction with nausea, vomiting, abdominal cramps and distention. Examination showed very extensive bilateral pulmonary tuberculosis, with a large cavity at

the right apex and a large abdominal tumor. Operation was begun with local anesthesia and on account of the many adhesions and incomplete relaxation ethylene-oxygen anesthesia was given. An adherent degenerating papillary-cyst-adenoma of the right ovary, 15 cm. in diameter, was removed, the adhesions were separated, and the partial obstruction was relieved. The pulse before the operation was 100, during 84, and at the close 130. The induction time was $1\frac{1}{2}$ minutes, time of anesthetic 55 minutes, and time to become rational 2 minutes. The skin was pale pink, dry and warm throughout the operation. The patient showed a mild degree of surgical shock at the close of the operation from which she recovered readily. There was slight post-operative nausea, no post-operative vomiting, and only moderate post-operative "gas." No complications have set in, and there has been a definite improvement in the pulmonary condition.

Thyroidectomy With Comparison of Nitrous-Oxide-Oxygen and Ethylene-Oxygen—Case 7. Mrs. W. R. S., aged 45, had a typical exophthalmic goitre with a basal metabolism of plus 29. The left lobe of the thyroid was removed under local and nitrous-oxide-oxygen combined anesthesia. The pulse before operation was 126, during 130, and at the close 124; time of induction was 3 minutes; times of anesthesia 40 minutes, and time to become rational 2 minutes. The skin was good color, slightly moist and warm. The patient was very noisy, frightened, and incompletely relaxed. She vomited three times after operation, had a moderate amount of nausea, and no gas. Four days later the right lobe of the thyroid was removed under local and ethylene-oxygen combined anesthesia. The pulse before the operation was 150, during 124, and at the close 124. The time of induction was 2 minutes; time of anesthesia 37 minutes; and time to become rational 3 minutes. The skin was pink, dry and warm throughout the operation. There was no post-operative nausea, vomiting or gas. The patient was calm and quiet throughout and the relaxation was satisfactory. The patient stated that she liked the ethylene anesthesia much better than she did the nitrous oxide.

Upper Abdominal Operation With Incomplete Relaxation—Case 8. Mrs. B. M., aged 52, had a cholecystectomy, appendectomy, drainage of the common bile duct and separa-

tion of partially obstructing adhesions from the sigmoid and colon. After 12 minutes of ethylene-oxygen anesthesia the relaxation was still incomplete and ether was given along with the ethylene and oxygen for 44 minutes. The pulse before the operations was 120, during 100, and at the close 96; time of induction 3 minutes; time of anesthetic 1 hour, and time to become rational approximately 30 minutes. The skin was pink, dry and warm throughout the operation. Relaxation was satisfactory only after ether was added. There was a moderate amount of post-operative nausea, slight gas, and the patient vomited twice.

SUMMARY.

Ethylene was discovered and used as a gas anesthetic by Luckhardt. A report of 116 ethylene-oxygen anesthetics occurring at St. Elizabeth's Hospital, Richmond, Va., in large part confirms the clinical observations of Luckhardt and Lewis.

The following points concerning ethylene-oxygen anesthesia were striking:

1. Beneficial effect of pre-anesthetic use of morphin and seemingly unnecessary use of atropin.
2. Ease and rapidity of induction.
3. More complete relaxation than with nitrous-oxide and incomplete relaxation in 66% of upper abdominal operations.
4. Absence of cyanosis and presence of pink color.
5. Slowing of pulse rate.
6. Absence of respiratory irritation and post-operative complications.
7. Absence of sweating and presence of dry, warm skin.
8. Slight increase in oozing.
9. Rapidity of recovery.
10. Low incidence of post-operative nausea and vomiting.
11. Low incidence of post-operative "gas."
12. Absence of any latent after-effects, and increased safety over other general anesthetics.
13. Average of 82% and limits of 75% to 90% of ethylene concentration to secure and maintain surgical anesthesia.
14. Explosibility of ethylene slightly less than that of ether vapor; caution in use of open flame and cautery in its presence.
15. Sorghum-like odor objectionable to only 3 patients.

16. Patients show preference for it over the other general anesthetics.

17. One failure for an anesthetic state, and failure to produce satisfactory relaxation for 13% of the 116 operations.

18. Report of eight illustrative cases.

CONCLUSIONS.

Ethylene-oxygen anesthesia produces a state of sleep more nearly that of normal than does any other general anesthetic. We feel that it is the most ideal routine general anesthetic yet known. It has made it possible for us greatly to lower the incidence of post-operative complications; to decrease largely the customary post-anesthetic discomfort; and to operate on certain very poor operative risks which without ethylene operation would have either been refused or in all probability would have proved fatal.

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THE INSPIRATION OF MEDICINE.*

By JOSEPH T. BUXTON, M. D., Newport News, Va.

Every life is a gift from the Creator of all life, a gift not to be despised or lightly regarded, but to be used in the accomplishment of the purpose which prompted the gift. For back of every life is a purpose. And we may count ourselves a success only as we fulfill that purpose.

This accomplishment is not possible unless we set before us ideals just as high as the purpose which underlies our life. We may and probably will not measure up fully to these ideals but certain it is that we shall never attain to anything higher than the standards we set up. Every life should have its ideals.

To me the highest conception of life is to be

*President's address before the Seaboard Medical Association of Virginia and North Carolina, Newport News, Va., December 4-6, 1923.

found in him who seeks to understand and interpret the needs of the lives of others and then to administer to those needs. The keynote of any life that may be termed successful is expressed in one word, "Service." We live, not to be ministered unto, but to minister. Service, unselfish and sacrificial, if necessary, is the key which unlocks the door of glory and opens up to us those honors which fame cannot give and which money cannot buy. We live in deeds not years, in thoughts, not in figures on a dial. He most lives who thinks the most, feels the noblest, acts the best."

Among the secular professions, there is none that offers a larger field or more abundant opportunity for genuine service than is to be found in the practice of medicine. It is a great and noble profession, worthy of the dedication of the best that is in us. It is impossible to estimate its value to the community and the opportunities it offers for service are well nigh unlimited. What greater inspiration can any man have than is to be found in the knowledge that in his work he may be a saver of life unto life and a contributor to the happiness of those whom he serves?

The first inspiration I would mention is that which is to be derived from the lives of those men who in the practice of their profession have immortalized their names by the contributions they have made to its advancement.

Time would fail me were I to attempt even to call the roll of all the illustrious men from whose lives we might gain some inspiration for a larger endeavor. I shall be forced to content myself with the mention of only a few, with the hope that from those suggested you may be inspired to make a study of others whose success was as a signal and who are equally, perhaps, entitled to our consideration.

It will not surprise you that in this connection I should make mention first of the name of Edward Jenner, of whom it has been said that, "the most consummate cynic must admit that, up to the present time, he has been the greatest benefactor of mankind the world has ever known." Of him it is said that the ignorant Indians declare "we shall teach our children to speak the name of Jenner and to thank the Great Spirit for bestowing upon him so much wisdom and benevolence."

His successful inoculation against smallpox

135 years ago robbed disease of one of the greatest scourges known to the medical world. In this day it is hard to appreciate the value of this great contribution. We have only to recall, however, some of the ravages of this dread malady to understand its significance. It is said that in the days of Empress Katherine more than two million souls perished in Russia alone. In the 16th century in Mexico three and one-half millions died, leaving scarcely enough alive to bury the dead. More than sixty million of people are said to have fallen victims to this disease alone in the century prior to the discovery of Jenner. Smallpox has been rightly called, "The most terrible of all the ministers of death." In Sweden, before vaccination, there were 2,045 deaths per million; since vaccination this number has been reduced to 155. In the Sheffield Epidemic, of the unvaccinated population, one in twenty died; of those who were vaccinated, one in thirteen hundred. Is any tribute too great to be paid to this great man?

October 16, 1846, was a real red letter day in the history of medicine, for on that day Dr. John C. Warren performed for the first time a major operation without inflicting pain. The discovery of anesthesia was the greatest boon ever given by the profession to mankind for the alleviation of pain. We have only to imagine a major operation without it to conceive of the horrors attendant upon surgery before its discovery. Not only so, but its discovery made possible the performance of many operations involving minute dissections, which prior thereto could not have been attempted. I have no doubt that in the final day of reckoning hundreds of thousands of men, women and children will rise to call John C. Warren "Blessed" for his great contribution to medical science. Ranking equally, probably, with the names of the two men to whom I have just alluded stands Joseph Lister, whose service to mankind can never be forgotten. Even after the discovery of anesthesia, surgery was still attended with much danger and many terrors. Before the discovery of antiseptic by Lister, blood poisoning, tetanus, and erysipelas were almost always attendant upon every operation. The result of the researches and investigations of Lister was to show to the surgeon how these terrors could be eliminated and life and health brought to many who otherwise would have

died as a result of the surgeon's knife. The name of Lister will live as long as man lives, for he lived to bless mankind.

Dr. William W. Keen, whose life itself has been and still is an inspiration to us younger men in the profession, in speaking of the place which such men have in the hearts and affections of those who today enjoy the benefits resultant upon their lives, makes the following beautiful comparison. He says, "In Mr. John Wanamaker's gallery is one of the most striking pictures I have ever seen. On a large canvas by Fritel, in the center of the picture, advancing directly toward the spectator, is a large cavalcade of warriors arrayed in corslet and casque. Their stately march at once arrests the eye. The leader is Julius Caesar. He is flanked by Napoleon and Alexander the Great and followed by Attila, Semiramis, and a lengthening host of those whom the world counts among its great 'Conquerors.' They advance between two long rows of rigid, ghastly corpses all stretched at right angles to their line of march. Spectral mountains in the distance hedge in a desolate plain given over to the vulture, the bat, and silence."

"I would that some artist might paint a companion picture of the 'conquerors in medicine,' instead of the 'conquerors in war.' Instead of spectral hills and a barren waste, the scene should be laid in a happy, smiling valley, bounded by the Delectable Mountains and kissed by a fertile sun. The stately procession should be led by Edward Jenner. He should be flanked by Joseph Lister and John C. Warren, and followed by Simpson, Billroth, Livingstone, Ambroise, Pare, Virchow, John Hunter, and many a modest, but unknown, hero who has yielded up his spirit in the performance of his duty. Instead of treading their way between lines of corpses, they should march between lines of grateful men and women and a host of God's little children who, on bended knee and with clasped hands, would reverently invoke Heaven's richest benediction upon their deliverers."

The second inspiration, to which I would refer, is to be found in the unexplored fields awaiting discovery. Medicine is a progressive science and there are many secrets yet hid from us and many discoveries yet to be made. We rejoice in the victories already won by which countless thousands have been liberated from the dominion of disease. But there remains

much still to be done. If we are true to our great profession, we will not sit idly by amid the ravages of the yet unconquered maladies but we will put to the best use the talents with which we have been endowed, in the hope that we may make some lasting contribution to the furtherance of medicine. Could there be a greater inspiration for the fullest dedication of our faculties than the possibility that by some service of ours we may be instrumental in alleviating human suffering and in bringing sunshine into those lives which heretofore have been dark? We have immense advantage over our predecessors for we have the heritage they have left us to build upon. Inspired by their successes and by what we may do we should suffer no limitations upon our endeavor.

Again I would invite your attention to the inspiration that comes from the faithful performance of the duties that come in the daily routine of life,—not the doing of the great things but the good we are able to do for the sick and suffering in the every day work of life. I refer to those ministrations about which no one ever knows but yourself and your patient. It may be the restoration of life to father or mother or child, it may be the lessening of suffering here and there, the bringing of comfort to one in distress or making easier the great transition of some soul who has been called upon to cease from its labors. This to my mind is the great inspiration of medicine. Dull and insensate indeed must be that man who is not moved thereby to the greatest effort of which he is capable. I can best tell you how great is this inspiration by adopting the language of another who in speaking of it has said:

"My best wish for you is that you may realize in your own lives these characteristics of the ideal physician. It will matter little then whether your life be long or short, for the proper measure of a life is not how long, but how it has been lived, and if you attain old age, when the hairs whiten and the crow's feet begin to show, when your natural forces are abated, you will then not be alone in the world, but will have honor, love, obedience, troops of friends, and one Friend above all others, the 'Great Physician.' And when you pass from this life into the next, then shall you be greeted not only by this one great Friend, but by many from whose pathway you have plucked the thorns and briars of this

earthly life; many whom, through the devious paths of convalescence, you have led back to perfect health, to home, husband, father, mother, children; and even if you have not been able to stay the hands of the Grim Reaper, those too will greet you whose last hours you have soothed amid the pangs of death and have helped through the new birth into the heavenly Jerusalem."

THE SURGICAL MANAGEMENT OF GALL-BLADDER DISEASE.*

By ARTHUR E. BILLINGS, M. D., Philadelphia, Pa.

There is still considerable difference of opinion as to the proper surgical treatment in disease of the gall-bladder. It is gratifying to see, as statistics in increasing numbers are being published from the large clinics in this country as well as from those abroad, that the same facts are being revealed which lead to uniformity of thought as regards the treatment of this very common lesion.

Two decades ago a patient who suffered from chronic dyspepsia with hematemesis was considered a fit candidate for gastroenterostomy. With a large number of operators at that time the actual demonstration of an ulcer was an unnecessary indication for the operation. We are all aware of the evil results that followed such a practice. Gall-bladder surgery, particularly cholecystectomy, has been abused much in the same way, but perhaps to a lesser degree. Much of this abuse can be attributed to failure in diagnosis or lack of judgment in the choice of the operation for the particular case, or both. The pathological intimacy that exists between the gall-bladder, appendix, duodenum and stomach which was not recognized until comparatively recently, served to complicate the diagnosis in gall-bladder disease. Such complications as chronic pancreatitis and hepatitis with hepatic insufficiency were not reckoned with in the treatment of this condition. In many instances a diseased appendix was removed or a gastroenterostomy was performed for duodenal ulcer while a pathological gall-bladder was left behind, with only partial or no relief to the patient. With our present knowledge of associated disease in these parts the discovery of

a lesion in one should mean careful investigation of the other for concomitant disease. Certain conditions, such as acute infection, poor general condition of the patient, etc., may occasionally prohibit the careful exploration that should be made a part of the routine procedure in these cases. Proper preoperative preparation of the patient will help to avert this complication. Too much emphasis cannot be laid upon the importance of the preoperative treatment, particularly in the jaundiced cases where duct infection is extensive and a high degree of cholemia is present, for as much may depend on this as upon the operation for the successful outcome.

Jaundice is a complication that demands special consideration from the standpoint of both preparation and operation. If it has existed for any length of time it becomes a tremendous hazard to immediate surgery even of the most conservative character. In these patients toxemia is marked, the calcium content of the blood is greatly reduced or exhausted, dehydration has taken place, the alkali acid balance is broken, and blood coagulation time may be lengthened to an alarming degree; the glycogenic function of the liver is disturbed and, briefly, hepatic incompetency is the condition that supervenes. To combat successfully this condition the prompt introduction of fluid is imperative. This may be accomplished through proctoclysis in the form of soda bicarbonate and glucose solution, normal saline solution by hypodermoclysis, or by intravenous infusion, or both. W. J. Mayo recommends the subcutaneous administration of a three to a five per cent solution of glucose, which we have used to great advantage. The intravenous administration of calcium chloride solution is indicated in all cases where blood coagulation is retarded, combined with free carbohydrate intake by mouth as recommended by Walters. Crile advises blood transfusion with heat applied over the liver as a preoperative and post-operative measure to stimulate activity in liver function. In severe cases blood transfusion is indicated before and after operation. Walters and Parham have clearly pointed out the close relationship of renal and hepatic insufficiency in obstructive jaundice. They state that operations on patients with obstructive jaundice offer three avenues of danger aside from the so-called accidents of surgery; these

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are hemorrhage, uremia and hepatic insufficiency. Walters and Bell of the Mayo Clinic have previously reported the necropsy findings in twenty-nine cases of obstructive jaundice in which serious postoperative hemorrhage had occurred in fifty-three per cent. A method of preoperative preparation was described and followed in thirty-four cases that have since come under their care, in only one of which did serious postoperative bleeding occur and in this case a ligature slipped on the cystic artery. Briefly, their treatment consisted in the administration of 5 c.c. of a ten per cent calcium chloride solution in redistilled water daily for three days. Large quantities of carbohydrates were given by mouth and glucose solution by proctoclysis in order to increase the supply of glycogen to the tissues of the jaundiced patient. Large quantities of water by mouth further increased the elimination of toxic bile products. In one of their cases a coagulation time of twelve minutes was uninfluenced by the administration of calcium chloride as directed above, after which blood transfusion was done and the coagulation time was promptly reduced to six minutes. They have not observed any toxic effects from the intravenous administration of calcium chloride either clinically or experimentally. The coagulation time should be reduced to normal limits to obviate the danger of serious bleeding after operation. A careful estimation of kidney function and blood urea should be made and ether anesthesia should be avoided. The tendency to uremia is marked in this condition and every precaution should be taken to safeguard the patient against it. It is one of the few conditions in which we do not use morphine routinely as an adjunct to the anesthetic. Gas-oxygen anesthesia is used routinely and with the very ill patients we combine it with local anesthesia, as advised by Crile. Biliary drainage through the duodenal tube, as advocated by Lyon, has proved of undoubted value in our cases as a part of the preparation before operation and of the after treatment.

The character of the operation in these cases is determined largely by the most urgent need which is biliary drainage; any operation of a more elaborate nature as a rule is contraindicated. If stones are found in the gall-bladder and common duct, a cholecystostomy with removal of stones should be done; if there is then doubt as to the establishment of suc-

cessful drainage, a choledochostomy should be done with the removal of any easily accessible stones. Any extensive exploration is ill advised at this time and any remaining stones and the gall-bladder can be removed at a secondary operation when there is less danger of a thorough operation resulting in a casualty.

A two stage operation in many cases is certainly safer for the patient. As to the management of acute inflammation of the gall-bladder uncomplicated by jaundice, operation is deferred as a rule for several days. If the cystic duct is obstructed completely, suppuration may have taken place but, with rest and heat locally and careful attention to the patient's general condition and elimination, the process will remain localized and subsidence in symptoms will usually occur in a few days. With the liver above, the transverse colon below and the omentum ever ready for mobilization, the anatomic position of the gall-bladder is such that infection of the general peritoneum rarely takes place even if the gall-bladder perforates. We, as a rule, under these conditions do a cholecystectomy after the acute symptoms have subsided. A small piece of rubber dam used for drainage is held in position near the cystic duct stump with a fine loosely applied catgut ligature. Where the gall-bladder is very adherent and edematous and identification of the common duct is difficult, the splitting of the gall-bladder on each side down to the cystic duct, turning the anterior free flap down and then doing a submucous enucleation of the posterior half, as advised by C. H. Mayo, simplifies the operation very much and helps to obviate injury to the common duct. Infrequently the acute symptoms may persist and it may become necessary to operate before subsidence in the attack has occurred. Our results in the cases on whom we have operated during an attack because of persistent acute symptoms have been entirely satisfactory.

A display of surgical judgment in the choice of operation for this type of lesion is essential. Drainage of, rather than removal of the gall-bladder will be indicated in a small percentage of cases, but cholecystectomy is preferable when the patient's condition warrants it. In the chronic type of gall-bladder with or without stones, uncomplicated by obstructive jaundice, we usually do a cholecystectomy. There are several reasons for this practice. First, when chronic pancreatitis is present, chole-

cystectomy with prolonged drainage, either by choledochostomy or through the cystic duct stump, gives better results than any other form of treatment. Secondly, the end results from cholecystectomy are more satisfactory than from cholecystostomy as shown in the statistics from the largest clinics in the country. Judd, in reviewing 2,027 cases in the Mayo Clinic, summarizes his impressions as follows:

1. "Removal of the gall-bladder reduces the risk of later trouble and ordinarily is to be preferred to cholecystostomy for drainage.

2. "It is not necessary to open and probe the common duct at every gall-bladder operation.

3. "Infection in the liver, gall-bladder or ducts is the most frequent cause of secondary trouble and may recur many years after the primary operation.

4. "The recurrence of stones is more frequent in the gall-bladder than in any other part of the biliary tract; the common duct is next in point of frequency.

5. "In a definite small percentage of cases stones will be overlooked in the common duct, in other cases the stones reform in the duct."

Of the 2,027 operations in this series, 219 or 10.8/10 per cent were secondary. In 109 of the 219 secondary operations calculi were found either in the gall-bladder, the ducts, or in both. Balfour and Ross report from the Mayo Clinic 5,997 cholecystectomies from January 1, 1910, to December 31, 1919, with one biliary fistula. For the same period they report 1,879 cholecystostomies with eleven postoperative fistulae. They state that comparative statistics of experienced surgeons show that cholecystectomy has a decided superiority over cholecystostomy in every respect, operative mortality, immediate and late results and biliary function.

Statistics such as these are illuminating and convincing. The gall-bladder after infection is once established in the form of cholecystitis probably never recovers completely even after drainage. There is much evidence to substantiate this postulation. Chronic hepatitis and pancreatitis are associated infections or complications which are favorably influenced or obviated by timely removal of the gall-bladder. There is still a group of the chronic cases which are puzzling from the standpoint of diagnosis, in which there are no stones present but a rather definite history of gall-

bladder disease with little or no gross evidence of cholecystitis on exploration except for a gall-bladder that does not empty easily on compression. Palpable enlargement of duct glands is usually absent, lipoid deposit in the wall of the gall-bladder may or may not be in evidence. I refer to the occasional case in which there is stenosis or angulation of the cystic duct which interferes sufficiently with drainage from the gall-bladder to cause the symptoms which are relieved by cholecystectomy. Seelig has directed attention to this in a discussion on bile duct anomalies. The stasis thus produced becomes a real factor in the development of advancing disease of the gall-bladder with the complicated infections so frequently associated with it, viz., pancreatitis and hepatitis.

In an exhaustive review by Peterman of the literature on the experimental work of the gall-bladder, it has been shown conclusively that stasis plays an important role in the etiology of cholecystitis. He found from this review that simple injection of virulent organisms, even in large amounts, into the lumen of a normal gall-bladder does not usually produce cholecystitis. Injection of virulent organism into the lumen of a gall-bladder in sufficient amounts after ligation of the cystic duct and vessels regularly produces cholecystitis. Intravenous injection of organisms, if in sufficient amount, is always followed by the appearance of these organisms in the bile. The organisms are probably carried to the liver through the blood stream, excreted in the bile, and carried through this medium into the gall-bladder; however, organisms are also carried at the same time among other places into the wall of the gall-bladder by the blood stream and lymphatics. Ehret and Stolz (whose work Peterman quotes) have observed that the organisms injected into the gall-bladder for the first few days increase in number and then decrease until the gall-bladder becomes sterile. This is explained on the assumption that increased concentration of bile destroys the organisms (Drennan). This may account for the large number of sterile cultures obtained from diseased gall-bladders at the operating table. Cholesterol is distinctly inhibitive to bacterial growth.

In cholecystitis streptococci are the organisms usually found. They are infrequently recovered from the bile but can nearly always

be found after maceration of the gall-bladder wall. Rosenow in experimental work on the etiology of cholecystitis and gall-stone formation has not only shown that the streptococcus is the most constant organism in its production but that it has definite powers of elective localization. The special affinity shown by different organisms for various tissues of the body has been seen over and over again clinically and this he has shown conclusively in his experimental work. He also maintains that infection of the gall-bladder is usually a result of blood stream infection. Mann has produced a specific cholecystitis by the intravenous injection of Dakin's solution; this Rosenow maintains supports elective localization from a chemical point of view. That it also occurs through the lymphatics less frequently is an accepted fact. In the course of gall-bladder disease there may be a cessation to the usual typical symptoms when the patient may be subjected to more remote disturbances such as neuritis, joint manifestations, and other constitutional symptoms, the gall-bladder thus acting as a focus of infection. In contrast to this, cholecystitis is undoubtedly often the result of focal infection elsewhere. Such foci should receive treatment in the routine management of gall-bladder infection.

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- 2020 *Spruce Street.*

CANCER OF THE MOUTH.*

By ROBERT LEE PAYNE, M. D., F. A. C. S., Norfolk, Virginia.

In the yearly report of the State Bureau of Vital Statistics, Dr. Plecker reports that there were forty-six deaths from cancer of the buccal cavity. This total of deaths from cancer of the mouth is not so large when compared with the deaths from cancer of other organs, but it goes to show that there are a larger number of individuals affected with incurable cancer of the mouth and that it behooves the surgeon to study these conditions and to do what he can to relieve the suffering individual. The mind of the surgical world at large is beset with the deepest pessimism when cases of cancer of the mouth and throat present themselves for treatment and, while the subject is a desperate one, it is not entirely hopeless. Various cancer hospitals throughout the world report practically no cure of cancer of the larynx and but few of the base of the tongue, but the state of affairs presented in cancer of the mouth lends a far more hopeful attitude, for the result in the treatment of this type of malignancy has been very gratifying and very encouraging during the last five years. The good results attained have been due to the recognition of the possibilities of radium in these cases, together with the realization of just how much can be added to the treatment through the aid of coagulation necrosis.

Cancer of the mouth cavity always originates in the mucous membrane covering the

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tongue, the floor of the mouth, gum, palate and teeth, and no matter from what point it begins, the close proximity to the maxillary bone always results in the early involvement of this structure. The early involvement of the maxilla in tumors arising from the mucosa of the antrum and the nose makes the separation of these from the tumors originating in the mouth almost impossible at times. In addition, the close association of nasal mucous membrane with the mouth mucosa combines to make malignancy in the upper jaw more frequent than in the lower, and because of this association we also see a greater variety of clinical and morphological types of cancers. Cancer of the buccal mucosa, of the floor of the mouth and tongue are very much more common than sarcoma, the relative frequency being about three to one. Cancer also appears somewhat later in life than sarcoma, usually during the fourth, fifth and sixth decade and true carcinomata are five or six times as frequent in men as in women. It is broadly estimated by some pathologists that the fatality from cancer of the mouth has in the past run from seventy to ninety per cent of the cases.

The etiological factor in cancer of the oral cavity has not been stressed to the laity at large by the medical profession, and entirely too little attention has been paid to the subject of chronic irritation as a causative factor. Some authorities state that false teeth and old ragged loose teeth are the main exciting factors in producing cancer of the oral cavity. It is certain that all chronic ulcers and fissures act as a predisposing factor in the establishment of carcinomata in the mouth. Another condition so frequently seen by all of us and so common in the beginning of a malignant lesion of the mucous membrane of the mouth is that of leucoplakia. Most skin specialists consider leucoplakia as potentially malignant from the beginning, while some pathologists state that carcinoma develops in thirty per cent of leucoplakia cases improperly or not treated at all. The writer believes that all conditions of leucoplakia in the mouth should be considered potentially malignant and treated as a precancerous lesion. Chronic irritation from the use of tobacco, arising from a hot pipe stem, the edge of a broken tooth or the presence of an old active pyorrhea all seem to lead to a condition which is not only favorable to malignancy but often termi-

nates in malignancy. Whenever an ulcer or a new growth appears in the mouth of an individual over thirty-five years of age and remains stationary for a period of three or four weeks, in spite of the usual appropriate treatment, then this case should be considered suspicious of an early malignancy.

The question of metastases in these cases of cancer of the mouth has the most important bearing on the treatment of the condition and it is a recognized fact that malignancy of the tongue and the floor of the mouth metastasizes sooner than any of the other types found in the oral cavity. Usually the metastasis in this type of case is on the same side as that on which the lesion is situated but it occasionally happens that the opposite side is involved in the metastases while the affected one remains comparatively free. Malignancy of the mucosa involving the inferior maxilla always metastasizes to the sub-maxillary lymph-nodes and this occurs early in the affection while malignancy of the buccal mucous membrane, strictly speaking, rarely metastasizes or, if at all, at a late stage in the progress of the tumor growth. The most singular feature relative to cancer of the mouth is the fact that in cancers involving the superior maxilla there is little or no tendency to metastases and this, of course, makes the prognosis and the possibility of treatment very much better in malignant tumors of the mouth arising from the mucosa covering the superior maxilla.

The majority of malignant lesions of the oral cavity are the true epidermoid carcinomata, but we often have to distinguish between the malignant odontomata as well as the frequent occurrence of sarcoma in one form or another arising from the connective tissue in the mucous membrane. In addition to the characteristic giant cell sarcoma or epulis which is comparatively common, we also have sarcoma of the round, the spindle cell, the mixed cell and the melanotic type arising in the mouth and jaw. The round and spindle cell types of sarcoma are highly malignant, grow rapidly and, unless carefully treated, always end in early death. The tendency in these growths towards recurrence is very marked and, if at the time of operative treatment any vestige of the new growth is left behind, there is a rapid return of the growth and an increased tendency to metastasize to other portions of the body. It is true however that sar-

coma of the mouth and jaw have very little tendency to metastasize early in their course of development. The sarcomata are much more common in the superior jaw than inferior. The basal cell type of carcinoma is rarely ever found within the oral cavity.

It is rare that any of these malignant conditions of the oral cavity present themselves to the surgeon early in the disease and the picture of an advanced malignancy of the mouth with the victim weak and emaciated from inability to take food or liquid, coupled with the pain and suffering, presents to us a problem that is difficult of treatment.

The success met with in the treatment of these cases in the last few years has been attained through three methods or agents for handling this type of cancer. These consist of surgical removal with the knife or removal by some method of coagulation necrosis and the institution of proper radium treatment. The question of sequence or the precedence of one of these measures over the other has created a division among the men who are treating and seeing these cancers of the mouth. One school believes that the lesion should always be thoroughly treated with the radium first and then removed with the knife or some form of cautery. The other school believes that cautery or some form of coagulation necrosis should be instituted first and then the site of the growth thoroughly treated with radium. The writer belongs to the latter class and it has been our practice during the past five years to treat these cases by first complete removal of the growth by coagulation necrosis and this to be immediately followed by massive radium treatment.

Before we had radium, we always destroyed these growths with the dull cautery and I cannot recall a single case that got entirely well or remained well very long. Since we have had radium, those cases which formerly we considered hopeless have given us a fairly satisfactory percentage of apparently complete cure which in some instances have remained permanent for a period of three to five years. The suffering of these patients after this form of treatment is very intense and they present a very pathetic picture as they linger along during the first six to nine months after their primary operation, during which time the sloughs are separating and the sequestra loosening from the maxillary processes.

Usually all pain stops when the last bit of dead bone comes away and following this the mucous membrane soon rapidly covers over the healthy bone and complete healing rapidly takes place.

In conclusion I would like briefly to report one case of the type under consideration in this paper.

Mr. J. S. A. admitted to St. Vincent's Hospital, December 23, 1920, with the clinical diagnosis of cancer of the mouth. Portion of the oral cavity involved was the floor and to the left side. The lesion extended from one-half inch to the right of the frenum along the left side of the floor of the mouth and as far back as the last molar tooth, passing up onto the lateral aspect of the tongue from the frenum backward as far as the last molar tooth and running over on the alveolar process along the whole distance from the frenum to the last molar. A section of tissue removed proved in the pathological report to be a squamous cell epithelioma.

On December 26th, under a general anesthetic, all of the lower teeth on the left side were pulled, up to the lateral incisor of the right side, and dull heat with cautery irons instituted for forty-five minutes until a complete and deep coagulation necrosis of the entire growth had taken place. Twenty-four hours later the entire area of cauterization was covered with 600 milligram hours of radium, the tubes being placed about one and one-half centimeters apart. There were a large number of tender and enlarged glands under the left lower jaw and these were at the same time radiated through the skin with a dose of 1200 milligram hours. February 17, 1921, the condition of the mouth was very satisfactory except just at the point of the frenum where there appeared to be some little tendency for hyperplasia and many of the glands of the neck persisted, though small and not at all tender. At this time 400 milligram hours of radium was given to a small area just corresponding with the frenum of the tongue and 1,800 milligram hours were applied to the glands of the neck through the skin with proper screen.

On March 30, 1921, practically all of the floor of the mouth was healed except for an area of necrosis near the site of the last molar tooth where a piece of loose sequestrum could be felt. Up to this time, from the date of the original operation the patient had suffered

considerable pain and it had been necessary at times to give him an opiate. At this visit a piece of the lower jaw was removed in the form of a loose sequestrum and following this all of his pain was immediately relieved. He never took another dose of morphia and, in approximately two weeks, healing was about complete over the entire affected area.

On June 11, 1921, the mouth was entirely healed; the patient had gained thirty-five pounds in weight and up to this date his mouth has remained entirely healed and he seems to be in splendid health in every respect. The tongue is somewhat fixed to the left side of the floor of the mouth by scar tissue but he has a plate with teeth which he wears with comfort and the cure appears to be complete.

305 *Tazewell Building.*

THE VALUE OF VITAL RECORDS.

By LLEWELLIN ELIOT, M. D., Washington, D. C.

The importance of Vital Records—records of births, baptisms, marriages and deaths—is paramount, and their value may be assumed greater in the event of destruction by fire, flood or tornado of the church or other building, where such records are preserved. Leaving aside the factor of personal or genealogic vanity in these records, as concerns the individual, certified copies of records may be demanded in cases of litigation over the distribution of estates, divorce suits, cases of illegitimacy, the age of consent, admission to schools, the operation of the Child Labor Law, and admission to Military Institutions of the Government.

Every community, worthy a name, files vital records and, upon the application of a properly authorized party, certified copy will be furnished. In furnishing copy, the custodian must exercise judgment, in order not to promiscuously betray cases of illegitimate births.

Unfortunately the place of preservation of these records is not always fire-proofed, nor sufficiently guarded to prevent abstraction by interested parties; there should be no reason for such laxity on the part of the authorities and, while it would necessitate an outlay of public funds to provide file cases, lockers or safes, the outlay would be justifiable.

A first child may be born and live at the expiration of six and a half months' gestation, after marriage, and there may be created much

gossip and scandal and, should the parties have been of the free and easy social class, it will require expert medical testimony, based upon a full and careful study of the physical development of the child to quiet these scandal-mongering tongues and to establish the fact that there had been no undue intimacy of the contracting parties previous to marriage. Cases bearing upon this point have been reported; they are matters of record both civil and legal.

Previous to a contracted marriage, State laws protect; where one or both contracting parties should be under the legal age, the written consent of the parents or guardian is required; should objection be raised, that objection must be of a justifiable nature, and sustained otherwise it falls as an objection; forced marriages or those contracted under duress may be nullified by recourse to the court of the jurisdiction; proceeding further, one finds the law requires a license issued by a court's officer; this license furnishes, under oath names, ages, places of birth, and usually, the name of the minister selected to perform the ceremony; it further requires that this license be returned to the court when the ceremony has been performed; a justice of the peace has equal power, as a minister, to marry applicants. I believe the presence of witnesses is usual but not obligatory.

We will suppose every requirement has been complied with, a permanent record is made, and through no ingenuity can this record be denied or falsified. No question can be raised.

Now, let us suppose an eloping couple will reach a county seat after the day's work is done, say about midnight, with law officers and irate parents close on the trail; it is impossible to find the clerk of court, no license can be procured, perhaps the clerk is not willing to get from his bed to help out in the case, time flies, and something must be done and done quickly or the elopers must seek another town. A midnight prowler gives the name of a minister and he is approached, the case explained; on solemn promise to furnish the license at the earliest possible moment, he will waive the license and marry them. His impecuniosity or his over-zealousness has made him violate the law but, trusting to faith in human nature, he does not feel any concern. The time passes and there has been a lapse of memory, a dishonest intention in delay, and it will follow there is no license procured. We have here

an illustration of crooked legalness or legal crookedness; there is no license, no record, possibly no witnesses; our minister begins to fret or worry, still he cannot say a word, for the reason that he is a violator of the law and it is hardly possible to suppose he would do a thing that would incriminate himself. There is no way through which any one, not even the contracting parties can prove marriage unless their "*ipse dixit*" be accepted as a fact, and the case does not come before a Court's jury for settlement.

Let us go further in this case; in time a child is born to these parties, the question now comes up, what standing in law does this child possess, although there may have been parties present at the ceremony; and mother and father have all social rights and privileges of a married couple; they are not married in the eyes of the law; they come under the stigma of "common law husband" and "common law wife," although the name of the father is given the child. Presumptive evidence is all that can be offered in proof of paternity.

A Court of Appeals would not confirm the verdict of a jury of a lower court rendered from motives of sentiment and pity; the common law stigma must stand and litigation be begun anew.

In the early days of the Colonies, three hundred years ago, provisions were made for cases of like nature, and the published "Intention of Marriage" was accepted; if made a matter of public record, frequently, the matter ended there; in some instances a marriage ceremony was performed by a minister or some other one commissioned by the court, notwithstanding the fact that some years may have elapsed between the "Intention" and the ceremony; whatever children born to this union were legitimate.

In a Report of the Record Commission containing Boston Births, Baptisms, Marriages, and Deaths, 1630-1699, one finds:

Colony of Massachusetts, General Court in September, 1639, ordered,* "That there bee records kept of all wills, administrations, inventories, as also of the dayes of every marriage, birth, & death of every person in this jurisdiction." In June, 1642, we read that "Whereas, at the Generall Cort the 4th 7th mo. 1639 there was provision made for the recording of severall particulers, amongst which it

is observed that birthes, deathes, & marriages are much neglected in many townes,—

"It is therefore ordered, that hereafter the clarks of the writts in severall townes shall take especially care to record all birthes & deathes of persons in their townes; & for every birth & death they so record they are to have allowed them the summe of 3d, & are to deliver in yearly to the recorder of the Cort belonging to the jurisdiction where they live a transcript hereof, together with so many pence as there are births and deathes recorded, & this under the penalty of 20s for every neglect; & for time past it is ordered, they shall do their utmost indeavor to find out in their severall townes who hath bene borne, & who hath died, since the first founding of their townes, & to record the same as aforesaid.

"Also the magistrates & other persons appointed to marry shall yearly deliver to the recorder of that Cort that is nearest to the place of their habitation the names of such persons as they have married, with the dayes, months, & years of the same; & the said recorders are faithfully & carefully to inrolle such birthes, deathes, & marriages as shall thus bee committed to their trust." In May, 1657, it was found necessary to go further, and, "This Court, taking into their consideration the great damage that would unavoidably accrue to the posteritie of this common wealth by the generall neglect of observing the law injoyning a record of all births, deaths & marriages within this collony, are therefore order that henceforth the clarks of the writts in each towne respectively take due care for effecting the same according to the intent of the aforesaid lawe; and in case any person or persons shall neglect their duty required by the said lawe more than one month after any birth, death, or marriage the clarke of the writts shall demand the same, with twelve pence a name for his care and paynes; and in case any shall refuse to satisfy him, he shall retourne the names of such person or persons to the next magistrate or commissioners of the towne where such person dwells, who shall send for the party so refusing, and in case he shall persist therein, shall give order to the counstable to levy the same. And if the clarke of the writts shall neglect his duty thereby injoynd him, he shall pay the following penalty; i. e. for neglect of a yearly retourne to the

*The spelling is as the record.

County Court, five pounds, and for neglect of retourning the name of any person retournable by this lawe, whether borne, married, or dead, more than thirty daies before his retourne to the County Court, five shillings, and that no future neglect may be heerein, the recorder of each County Court is hereby injoynd from time to time certify the County Courts repectively the names of all such clarks as shall neglect to make their yearly retourne according to this lawe, who, uppon notice, given, shall send for such clarke, and deale in the case according as lawe requirith."

These records are still in a fair state of preservation and may be consulted by those who may be interested.

The preservation and recording death records has become at this time an easy task; there are a number of persons required to supervise a burial,—an undertaker, a grave digger, a minister, and the family of the deceased. Records of deaths give places of interment; it is, therefore, not a very easy thing to illegally bury a body, at the same time they are necessary to the records of a State.

The difference between Vital Records and Vital Statistics, is, the one deals with the person, the other deals with morbidity and mortality.

1106 P Street, Northwest.

A PROBLEM IN DIAGNOSIS.

By ALLEN H. MOORE, M. D., New Market, Va.

Despite the rapid advance of medical science, we still have with us diagnostic perplexities. Laboratory auxiliaries are commanded, but even with our perfected technique we are too often utterly in the dark as to the prevailing pathology. Do we not at times label a patient with a certain diagnosis haphazardly without thoroughly investigating via improved laboratory methods? We do. But does the laboratory always hand us a solution to our diagnostic problem? It does not.

It is deplorable that the public expects and demands of us a positive diagnosis upon our initial bedside visit. This certainly tends to create a "snap-shot" diagnosis and unintelligent explanations. I do not believe that we should depend too much on laboratory assistance, yet at times we cannot offer satisfactory or scientific reasons for existing symptoms without it.

On June 13, 1923, a patient, Mr. S. S., consulted me at my office for the first time. He complained of a constant nervousness, a feeling of weakness and a daily remitting headache. He wore an anxious expression and was somewhat melancholy. His family history was negative as was his personal history. He denied venereal infection. Physical examination revealed nothing. He was a well-built, tall, muscular individual. His temperature was normal. I specifically mention this for later comparison.

I informed the patient that my physical examination revealed nothing of a serious nature and that I thought a vacation was much needed. I prescribed complete rest, good, nourishing food, the usual hygienic measures and sodium bromide.

He returned to his work, stating that he was too busy just then to leave. On June 26th he came back to me, exhibiting the same symptoms. He stated that in the forenoon he felt perfectly well but in the afternoon his headache returned, as did his feeling of general weakness and nervousness. His appetite was poor. A second complete physical examination was also negative. His temperature was still normal.

He sought the advice of another physician who failed to locate any definite pathology. A third physician was consulted. At this time, July 29th, he was having a profuse sweat, chills and running a temperature of 103. He was referred back to me with a tentative diagnosis of malarial fever. In as much as he had recently moved from a malarial infested part of the state, this diagnosis seemed not improbable.

I made a third complete physical examination with a negative result. I prescribed quinine and put the patient to bed. The following laboratory work was done:

1. Blood smears for malarial plasmodium.
2. Blood culture for typhoid fever.
3. Widal reaction for typhoid, para-typhoid-A and para-typhoid-B, and colon bacillus.
4. Blood Wassermann.

5. Sputum examination for tubercle bacilli.

Repeated laboratory examinations were all negative. After being in bed for a few days, there was noted a slight improvement. The headache, chills and profuse sweating disappeared. The temperature curve was lower.

The temperature was normal until about noon and then there was a daily rise to 100 or 102. There was a decided improvement in his mental condition, but he stated that he still felt very weak. Up until August 6th, his condition remained about the same.

I asked for consultation. My consultant could find nothing definite. He suggested that the patient was having an atypical typhoid infection or a hidden tubercular infection. We decided to have him entered for hospital observation and treatment. A third consultant was called in to see the case. Repeated physical examinations were negative. Laboratory examinations were continued. X-ray examinations of the chest did not reveal tubercular pathology.

No diagnosis was made. His condition remained about the same. On August 24th, it was decided to remove him to the Johns Hopkins Hospital, Baltimore, Md., for further observation, where he remained until October 26th. His temperature continued remittent in character, varying from 100 to 103½. His headache returned and his feeling of weakness continued, more in the afternoon, when his fever was most pronounced. He had occasional sharp shooting pains in his chest and abdomen, and at one time had a bursitis of the left knee. The only definite thing that could be made out upon physical examination was a left side internal ear deafness and a slight general glandular enlargement. In spite of his fever, he gained fifteen pounds in weight and gained strength proportionately.

The following laboratory examinations were made:

Urine—No abnormalities found.

Spinal Puncture—Normal pressure; normal number of cells.

Wassermann—Negative.

Negative *colloidal mastie and colloidal gold curve*.

Stool Examination—Negative. No ova or parasites found upon numerous examinations.

Blood Cultures—Two every week, aerobically and anaerobically, all of which were negative with the exception of two, from which were obtained an anaerobic hemolytic streptococcus.

Intradermal Tuberculin Test was negative.

X-Ray of Sinuses—Sinuses clear.

X-Ray of Chest—Lungs clear; heart and aorta not enlarged.

Gastro-intestinal Series—Stomach normal. No lesion in stomach or duodenum. Caecum a little dilated. Transverse colon a little prolapsed.

Impression—Normal stomach with a few lower quadrant (right) adhesions.

X-Ray of Teeth—No periapical granulomata.

Gastric Test Meal—No evidence of retention; normal acidity. No blood.

Bacteriological examinations and blood serum tests for specific agglutinins against the following organisms: B. Typhosus; B. Para-typhosus-A; B. Para-typhosus-B.

Nose and Throat Consultation—Inner ear deafness with no involvement of the vestibular branch of the eighth nerve.

Ophthalmoscopic-ophthalmological examination—The eye grounds revealed nothing abnormal.

The temperature has subsided and the patient discharged from the hospital as improved. No definite diagnosis has been made. It was the opinion of those in charge of the above noted investigations that the continued fever had been due to a streptococcus viridans bacteremia. There was no evidence of an endocarditis. The portal of entry was not determined.

In recapitulation, it is interesting to note that a great deal of laboratory work was done and the work properly checked. Repeated complete physical examinations were made with negative results. The portal of entry of the existing infection was not determined. A bacteremia was the most plausible diagnosis.

THE CLOSED METHOD OF TREATING EMPYEMA vs. RIB RESECTION: SUMMARY OF CASES.*

By G. CARLYLE COOKE, M. D., Winston-Salem, N. C.
Department of Surgery, Lawrence Clinic.

Since there is great diversity of opinion as to the better method of treating empyema and as there are many who still adhere to the open treatment, it seems that there should be a more or less standardized procedure employed, and as this can only be brought about by the advantages of one method outweighing all others, it is the purpose of this paper not to present anything new, but to point out the merits of the closed method over the old very unsatisfactory rib resection.

*Read before the North Carolina State Medical Society at Asheville, April, 1923.

PATHOLOGY.

In considering the treatment of any disease process, the pathology, of course, must be understood in order that scientific counter actions of the different processes may be affected in rotation, otherwise the treatment is empirical. The aetiology and symptomatology will not be discussed as the diagnoses can always be made so easily by the use of a needle and the exact location so accurately mapped out by the use of stereoscopic roentgenogram.

The pathological lesion of empyema and pleurisy with effusion, both of which are considered in this discussion, occur in a cavity in which there is normally more or less a vacuum, with a negative pressure of about 8 m.m. Hg. on expiration to 12m.m. Hg. on inspiration.¹ This suction force serves in the place of an anatomical structure to pull the lung equally in all directions, to expansion with the expansion of the chest cavity during inspiration, and not interfere with the change in position of the lung surface with relation to the inner surface of the chest wall during respiration. Regardless of the causative organism, the mechanical derangement is the same. The fluid always gravitates to the lowest point available as the negative pressure does not alter the laws of gravitation. If there are no adhesions between the visceral and parietal layers of the pleura, the fluid will fill up from the bottom, and the negative pressure will not be neutralized until the lung is completely collapsed or has no more tendency to contract of its own normal resiliency. Therefore, it depends on the *modus operandi* of the causative agent as to whether the serous surfaces will become adherent so as to hold the lung in expansion before sufficient amount of exudate has collected to deplete the vacuum, or to cause a barrier against the fluid in lines of cleavage and cause the formation of thin sheets of fluid at different levels, and the surrounding line of adhesions serve to pull the lung in expansion with the expansion of the chest during inspiration. If the exudate begins as a fibrinous one before fluid collects, one can readily see how these adhesions occur, holding in their meshes pockets of pus of later formation. This is nature's way of tending to limit the disease in two ways: first, by limiting the space for fluid collection, and second, by maintaining respiration and circulation of the affected lung. This same process holds true in massive effusion with complete collapse of the lung.

Any fluid collecting in the pleural cavity contains in it fibrin-forming substances, and the resulting fibrin, which will form sooner or later, bridges the visceral and parietal pleura. Fibrin stimulates the growth of fibrous tissue,² or fibrous tissue is prone to grow luxuriantly into fibrin; it seems to use fibrin in its own formation so that in this way adhesive bands connecting the two pleural surfaces later contract, tending to pull the lung out. If this is not accomplished, the fibrous tissue will increase at the expense of the fluid and hasten its absorption, at the same time binding the lung surface to the chest wall. If this process be allowed to continue and the infection is not overwhelming, there may be walled off areas of fluid which are so often broken up at rib resection with the finger, frequently denuding areas of the lung surface, opening up new avenues for septic absorption, or causing the infection to spread back into the lung to the extent of lung abscess or secondary bronchiectasis.

The above process may take place in the presence of fluid but, if there is a pneumothorax, the pathology is entirely different. In the first place, the pleura is much less resistant to infection in the presence of pneumothorax than in any other state,³ especially when it comes on suddenly. In my opinion this accounts for many cases which rapidly succumb to rib resection, together with the opening up of fresh tissue to the infection, both of the pleural surfaces and chest walls. Air does not float fibrin, so that, when a lung is collapsed by air, the fibrin-forming substances poured out on the pleural surfaces stimulate the thickened pleura to increased stiffness. This prevents the expansion of the lung completely with scar tissue which, when the cavity is obliterated, will affect it by filling the cavity with granulations or by pulling the chest wall in on the lung, thereby marking the victim with asymmetry of the chest for life, which is the general rule following rib resection. It is needless for me to say that the scar from thoracotomy may be as unsightly as any other operative label.

Another condition which is frequently overlooked when considering the pathology of empyema, especially where there is a large quantity of fluid, is that there is more or less displacement of the mediastinal structures; in massive effusions, the opposite lung may be encroached upon by the pressure and, as the

heart is held between the lungs, it also suffers from pressure. The great vessels, especially the veins, may have their lumina compressed, hindering the return flow of blood to the heart. In this way we may account for a great amount of cyanosis and dyspnoea seen so often, (for the respiratory stress cannot be accounted for by the lessened lung capacity in a great many cases but is due to toxæmia of the inflammation and the above mentioned conditions),⁴ and the alteration of the mediastinal circulation and the effects of the change in position of the mediastinal structures on the cardiac and pulmonary nerve plexuses. When the condition comes on slowly, these structures may adapt themselves to the new position so that their functions may not become markedly altered, but any sudden change in these relations may bring about conditions of great importance which will be referred to under treatment.

As it is an admitted fact that thoracic suction plays an important role in maintaining a return flow of the venous blood to the heart, one can readily see how any condition lessening this function would materially alter the general circulation. Another point of much importance is the consideration of the proper method of treatment.

TREATMENT.

The most efficient method of treating empyema is the one which will most effectively rid the sufferer of the products of inflammation; in other words drain the abscess, and combat the causative agent, and at the same time maintain as nearly normal condition of the body as a whole as possible. In the first consideration, which I think can be well applied here, the treatment should not be left to the mechanical procedures alone, and I mention the importance of food, comfort and rest so that their importance may not be lost sight of. When any active boiler is leaking steam the only resort is to increase the fires until the leak is stopped. Bodily resistance is entirely dependent upon the nutrition of the individual, which is gained only by plenty of good food, warm body and rest. Preparation must be made to prevent all muscular exertion and mental anxiety as far as possible.

In discussing the operative methods, the one of preference will be described and the points of merit will be noted in turn. The patient is placed on the table in a position which is

most comfortable to him, not upon the unaffected side any more than is necessary to gain access to the most dependent point of the fluid collection and, as only a small opening is to be made in the skin under a local anæsthetic, this can usually be done with the patient on the back. A sharp trochar that will admit a soft rubber catheter of 18 or 20 f., which has been perforated on the opposite side from the regular eyelet, is inserted through the chest wall and, as soon as no resistance is felt, the obturator is withdrawn sufficiently to allow the catheter to be inserted through the opening at the Y without allowing the escape of any pus or the ingress of any air into the chest. The trochar which has been especially designed for this method is best (Fig. 1) but, if one is not available, an ordinary gall-bladder trochar, or straight one, will suffice, as the procedure can usually be accomplished so quickly that any leakage will be negligible, provided the catheter fits the trochar. The other end of the catheter is clamped and, when the entering end is in the pleural cavity not over 3 c.m.

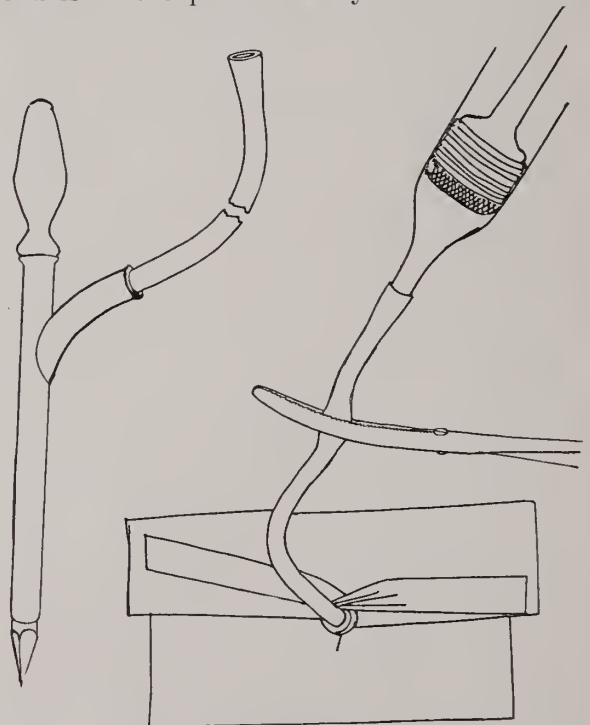


Figure 1.

approximately, the trochar is withdrawn leaving the catheter in place. Before any fluid is allowed to escape, the catheter is well anchored to the chest wall and, if the skin incision has not been made too large, this can be done with adhesive. The only dressing necessary or even impermissible for an air-tight joint is a small

piece of gauze wrapped around the catheter and held by tightly applied adhesive strips as illustrated in Figure 1.

Now, in order to determine accurately whether or not the negative pressure has been depleted or whether there is positive pressure in the chest, I have improvised a water manometer about 20 in. (or 50 cm.) long, graduated in m.m. Hg. and a connection so that the fluid escaping, if any, will indicate the pressure on the manometer by displacing the air in the receptacle attached, as shown in Figure 2. If there is marked positive pressure, the catheter is clamped and no more pus allowed to escape until it can be attached to a permanent drainage receptacle (Figure 3), with a stop cock interposed so that the flow can be regulated at will. As soon as this is

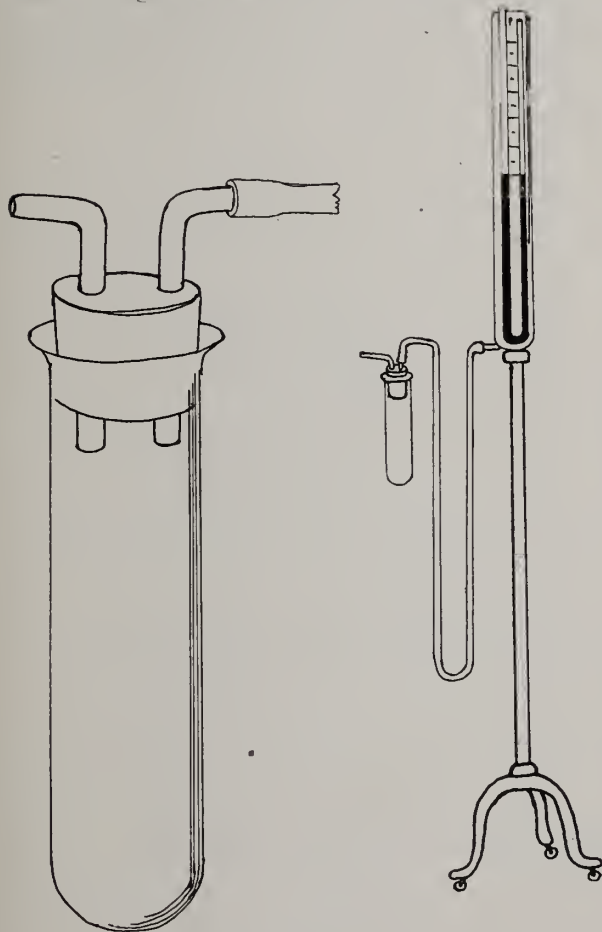


Figure 2.

done, the patient is returned to bed and the massive effusion with distention of the chest wall, displaced mediastinal organs and other conditions mentioned under pathology are slowly abated. Varying with the amount of

fluid present, the time utilized in completely evacuating the chest ranges from a few minutes to thirty-six hours. In this way the risk of shock can be entirely eliminated, the time that the patient has been kept from his room is so short that any mental anguish is *nil*, and there is no need for a general or extensive local anæsthetic, either of which has its disadvantages in doing a rib resection.

Figure 3 shows the type of vacuum which is easily obtained and the one which is used at the Lawrence Hospital. It is merely a 4 liter bottle fitted with a rubber stopper which has been pierced for 2 L-bent glass tubes. One tube is connected to the stop cock in the catheter and the other to a suction pump with a back flow check valve. As the fluid is slowly withdrawn by creating just enough vacuum in the bottle to maintain a constant desired flow, time is allowed for the complete re-adjustment of the thoracic organs and for restoration of the breathing capacity of the collapsed lung which is held in expansion equal to the evacuation of the fluid. This does not cause shock as it allows the lung to take up its increased circulation gradually. Frequently large clumps of fibrin will clog the catheter, but this has always been satisfactorily overcome by attaching the catheter to a large glass piston syringe (Fig. 1) and forcing salt solution through the catheter till the clot is dislodged. If it is then impossible to remove the

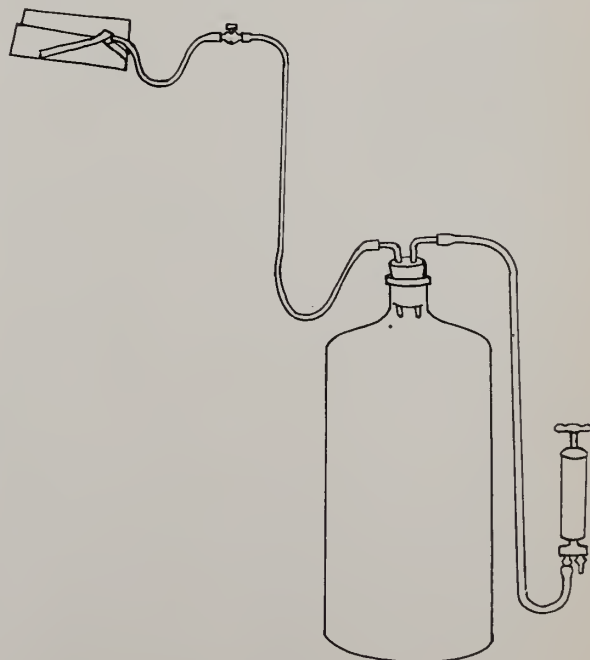


Figure 3.

fluid, one or two ounces of chlorazene solution, 1% is instilled and allowed to remain for an hour. The catheter should always be clamped before it is detached from stop cock or syringe for, if an air bubble enters the cavity, it will rise above the fluid and cannot be withdrawn until the fluid is completely evacuated.

If the fluid flows freely and no fibrin blocking occurs, the vacuum can be left in place so that every drop of fluid will be withdrawn as fast as it accumulates and the cavity only irrigated daily with a 1% chlorazene solution. When there is great amount of fibrin and clots, the vacuum may be left off for a few days and the cavity irrigated every two hours with about two ounces of the chlorazene solution and each time an ounce is left in to effect solution of the clots. Each day after the cavity has once been emptied, the fluid will decrease and finally the pleural surfaces will become adherent,

holding the lung in an expanded condition. Then the cavity may be irrigated and aspirated only once daily till the exudate becomes clear, when the catheter can be withdrawn and the wound dressed tightly, as the patient's resistance will by this time have increased so he will take care of any further accumulation and recover entirely. However, it is a good rule to watch the patient three days longer and note any temperature rise in case further accumulation occurs. If it is necessary to re-establish drainage, the catheter can be re-inserted through the old track without the use of a trochar and the treatment repeated till well.

There are certain essential factors that must be strictly observed for the treatment to be a complete success and some of these, I will admit, are difficult at times, but if one will keep up patient and persistent effort, the results

SUMMARY OF TEN CASES TREATED BY RIB RESECTION AT THE CITY MEMORIAL HOSPITAL.
THESE CASES WERE PICKED AT RANDOM.

Case No.	No. of days in hospital	No. of dressings	Complications	Condition on discharge
S-1353	10	10	0	Discharged draining.
S-1189	210	230	0	Discharged draining.
S-1628	20	20	0	Discharged draining.
S-2343	42	43	0	Discharged draining.
S-1951	14	18	0	Discharged draining.
S-1990	11	11	Bronchial fistula	Died.
S-60	14	14	0	Discharged draining.
S-336	24	30	0	Discharged draining.
S-1214	17	20	0	Discharged draining.
S-1276	5	5	0	Discharged draining.
Average.	36.7	40.1	1	1 death.

All the patients in this group left the hospital draining, and most of them had no record showing that their tube drain had been removed so that the final result cannot be given in those discharged.

SUMMARY OF TEN CASES TREATED BY THE "CLOSED METHOD" AT THE LAWRENCE HOSPITAL. CASES TAKEN AS THEY CAME ON THE RECORD FILE.

Case No.	No. of days in hospital	No. of dressings	Complications	Condition on discharge
1190	29	4	0	Cured.
1089	30	6	{ Inter-lobular abscess.	Cured by open drainage.
1098	30	5	0	Cured.
1068	27	5	0	Cured.
633	30	4	0	Cured.
214	13	3	0	Cured.
1691	34	6	0	Cured.
326	18	3	0	Cured.
1617	34	6	0	Cured.
.....	12	3	0	Cured.
Average.	25.4	4.5	1	No deaths, all cured on discharge.

will be well worth it. *First*, the catheter must not be introduced too far into the pleural cavity, as it may double up against the walls and kink, thereby obstructing its lumen, or the end may project upward above the fluid level and not drain the most dependent portions, whereas if the eyelet simply remains clear of the chest wall, drainage will be complete. It is well to have the catheter marked in centimeters so one can tell just how far in the chest it is. *Second*, all air must be strictly excluded from the chest by carefully clamping the catheter before changing any connections. *Third*, there should be persistent irrigation with chlorazene solution as frequently as is necessary to dissolve and wash out any fibrin that may be present which may prevent complete drainage. *Fourth*, the catheter should be carefully watched and kept secure, and all precautions used to prevent the patient from pulling it out.

COMPLICATIONS.

Probably the most alarming accident which sometimes occurs is a sudden minute rupture of the lung surface into a bronchus and the development of a pneumothorax by allowing air to escape into the cavity from the lung, the latter collapsing just as if air had been admitted through the chest opening. I have seen this occur in three patients, but it caused no untoward results. When it occurs, suction and irrigation should be discontinued, except at most once daily, and the opening will heal over in a short while and the lung can be re-expanded. Care should be taken not to force fluid into the chest at this time as it may gain entrance to the lung and cause the patient distressing expectoration. Aspiration should not be discontinued more than forty-eight hours even in this condition, because sometimes a tag of fibrin will fall over the opening in the lung and act as a valve so that, on inspiration, air will be sucked into the cavity. As this cannot be expelled, the patient will "pump himself up," so to speak, even to the extent of causing death; however, if aspiration is kept up occasionally, this will be avoided.

CONCLUSIONS.

1. The treatment by the closed method is applicable to almost all cases of empyema.
2. By universal employment of this method, many cases of the acute streptococcic infection that would succumb to rib resection will be

saved, and the convalescence is much shortened in all cases, without the scarring that usually follows rib resection.

3. There is great saving in time and material by the few dressings that are required, besides avoiding the great discomfort to the patient that accompanies drainage by the open method.

4. There is most always a rapid return of appetite and vigor with no evidence of septic absorption which often follows several days after the opening up of a large suppurating cavity by rib resection because, once the pus is evacuated, the pleural cavity is obliterated by a functioning lung.

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719 Oak Street.

THE USE AND ABUSE OF TOBACCO.

By JAMES C. McGUIRE, A. M., M. D., Washington, D. C.

In praise of tobacco Charles Kingsley wrote in "Westward, Ho!" "When all things were made, none was made better than this, to be a lone man's companion, a bachelor's friend, a hungry man's food, a wakeful man's sleep, a chilly man's fire."

Now that John Barleycorn is supposed to have departed this life—though in some places, the announcement of his death seems premature—those who have been so zealous in prohibiting the things they personally abhor are turning their attention to prohibition of tobacco. A number of states have already passed laws prohibiting or restricting the sale of cigarettes, but in several there is already appearing a revulsion of feeling. The chief objection seems to be against cigarette smoking, bad-smelling pipes and cheap cigars are more or less permissible but "no cigarette fiends need apply."

For over three hundred years the pleasure derived from the use of tobacco has been eulogized in prose and verse. Indigenous to this country and used by the Indians from time immemorial, at first by inhaling the fumes through a pipe, other forms of its use were soon inaugurated by Europeans, to obtain its pleasurable, soothing effects. It is of interest

to note Humboldt, the great scientist, declared "The ancient Indian name tobacco referred to the pipe alone and not to the weed." At one time it was used as a basis of money, even clergymen gladly accepting it in payment for their services. First, I shall speak of how the great men of the world enjoyed the soothing effects of tobacco, praised and advised its use, then refer to those anti-tobacco zealots who have made ridiculous statements about it and the harm it may cause, endeavoring to prove most of their statements untrue. Most of the world's greatest authors, scientists, dramatists, musicians, poets, physicians, and even clergymen, have written of the great pleasure they have derived from the use of tobacco. The French dramatist and poet, Moliere, declared "Whatever Aristotle and all other philosophers may say, there is nothing like tobacco. The man who lives without it is not fit to live." Mark Twain confessedly smoked on an average of ten cigars a day and often praised their use. General Grant was still more addicted to its use, seldom being seen without a cigar in his mouth. It has been said that his excessive use of tobacco caused cancer of the throat, but, even if he had cancer, it could not have been caused by smoking, for no reputable physician would now declare that the fumes of tobacco could by any possibility cause a malignant growth.

The scientist Huxley did not start to smoke till he was over forty years of age, but later was said to have tried strenuously to make up for lost time. Darwin used snuff. Stevenson wrote: "Tobacco is a thing to be remembered, it is so dry and aromatic, so full and so fine." Thackeray agreed with the essayist Carlyle that "The pipe draws wisdom from the lips of philosophers and shuts the mouths of the foolish."

Would that some of those opposed to the use of tobacco would take this to heart. According to an old Spanish proverb, "A paper cigarette, a glass of fresh water and a kiss of a pretty girl will sustain a man a day without eating." Spencer in his "Faerie Queen," describes tobacco as "most divine." The novelists, Thackeray, Stevenson, Collins, Dickens, and many others were all great pipe smokers. Many of Dickens' characters used tobacco and praised its use. Surely you remember Tony Weller, the father of Samuel, who continually advised his son to "Bevare of the

vidows" and who was never so contented as when he had a pipe between his lips. The poet, Thomas Hood, said

"Some sigh for this or that,
My wishes don't go far,
The world may wag at will
So I have my cigar."

According to the great novelist, Bulwer Lytton, "He who does not smoke has either known no great grief or refuses himself the softest consolation next to that which comes from heaven." Again he says, "Women in this scale, the weed in that, Jupiter hang out thy balance, and weigh them both, and if thou give the preference to women, all I can say is the next time Juno ruffles thee, oh Jupiter try the weed."

For the particular benefit of spiritualists, I will quote from a book recently written in all seriousness by a thorough believer in spiritualism, the great English scientist, Sir Oliver Lodge, that he had a communication through a medium with a departed soul now in heaven who declared "I was greatly encouraged at first to learn that smoking is permitted above, as well as below, but I was depressed to learn that the heavenly Habanas are apparently of poor quality, not made of solid matter but out of essences, ether and gases."

The great statesman and soldier, Bismarck, once declared the greatest pleasure he had ever derived from a cigar, was the one he did not smoke. "Reserving it, as his last cigar, looking forward to the pleasure he would later derive from smoking it, on a certain battle field he noticed a man shot through both arms and suffering intense pain. Bismarck wishing to help him, at first found only gold coins in his pocket—this could do the poor fellow no good; then remembering his precious possession, his last cigar, he lighted it and placed it between the soldier's lips; the smile of pleasure as the man took his first whiff could never be forgotten."

Lord Northcliffe, the English newspaper owner and editor, after lauding the "Yankees" fighting so bravely in the first trenches in France, advised their countrymen to send them cigarettes, chewing gum, magazines and newspapers; always you notice in such advice, cigarettes come first. According to the Department of Agriculture, thirty-nine billion cigarettes were produced in the United States

in the last year. There being such a demand for cigarettes, surely they must have much intrinsic merit or they would have been driven out of the market years ago by the fanatics who spend millions in trying to suppress their use.

In the last great European war, we all know how our soldiers desired them above all things, for the comfort they derived from them in the first line trenches or on forced marches, in the monotony of camp life, during convalescence from wounds and illness. A well known Army surgeon reported "I believe a wounded man waiting for his turn to appear on the table for a surgical operation is better fitted for the ordeal after smoking a few cigarettes than if he had been given a strong drug. We surgeons not only allow it but encourage their smoking. I have seen a whole ward, thirty to forty beds occupied by severely wounded men, complaining, restless, even crying with pain quieted with cigarettes and candy." A lady returned from abroad where she had helped the girls in distributing tobacco to wounded and convalescing soldiers as they arrived by train in London, Paris and other cities says "If you could see how thankfully they receive them one would think even the most violent opponents to tobacco could hardly have the heart to deprive them of this solace."

Recently, an officer in the Aviation Corps, lost in a desolate part of Mexico, was found in the last stages of exhaustion and starvation; his rescuer declared the first thing this man said was "Please roll me a cigarette."

During the War, General Denikin of the Russian Army received through the Red Cross a consignment of American tobacco for himself and his troops. He said "With a regular ration of American tobacco the Southern Russian forces could drive the Bolsheviks out of Moscow in short order." He places tobacco in the first position as a stimulant to morale among soldiers. Occasionally, letters appear in newspapers blaming the Government and individuals for furnishing cigarettes to the soldiers. A clergyman recently declared "It is a very wicked thing to do, for it is well known that smoking has a deleterious effect upon the nerves and makes the men unfit for their strenuous life." Later I will prove this to be untrue. Another wrote "Cigarettes are the invention of the devil and will lead to all forms of sin," then adding the absurd statement "I

believe cigarettes cause pneumonia so prevalent among our troops." He might as well have said their use caused smallpox. But evidently there is a difference of opinion among some clergymen at home and those who were in the fighting line. A soldier tells of "a preacher man" who one Sunday walked six miles with a baseball bat in one hand and a bundle of cigarettes in the other, to give the boys some pleasure. "He asked if he could help us with our stalled mules. We replied 'Sure you can, by passing on so we can talk to these damn stubborn beasts in the only language they understand.' After the clergyman had talked to us and distributed the cigarettes one of the boys said 'I never before believed there was such a lot in this Christianity business. Now I am converted all right.'" The clergyman smilingly replied "You are all right, boy, you are on the right track." Surely this "preacher man" understood human nature wherever he found it. Finally, General Leonard Wood declared "The idea of sending tobacco to the American soldiers in France is a capital one. Nothing gives a soldier in the field more pleasure and contentment than a cool refreshing smoke after a hard day's fighting or waiting call to the firing line. Life in the trenches is very hard and I know the American soldier will appreciate and enjoy remembrances in the form of tobacco, cigars, cigarettes and pipes." In this opinion General McCain and most of the officers in the army and navy concur.

During a period of years I have mentally recorded a number of questions asked me as a physician as to the harmfulness of the use of tobacco, particularly in the form of cigarettes. From the very beginning, those who use tobacco were vilified, condemned to everlasting perdition and doomed to physical degradation, yet those who so expressed themselves were the least qualified to judge, for they persistently ignored the results obtained by investigations of competent physicians and others who scientifically studied the question. With the greatest assurance they iterate and reiterate statements that time and again have been proven false, such as "Tobacco contains a deadly poison that all scientists declare to be a strong stimulating narcotic." This statement has even been made by some physicians who should know better, for nicotine is neither a narcotic nor a stimulant.

Narcotic is properly defined, as an agent

causing sleep and allaying pain. Tobacco has no such effect; therefore it is not a narcotic, nor is it a stimulant. On the contrary, it is a strong sedative, quieting restlessness and calming bodily disquietude.

There is another statement that "There is two to five per cent nicotine in a good cigar, one-half to one grain in a cigarette." If this were true, one cigarette would contain enough poison to kill a number of men. They further show their ignorance of the nature of nicotine by measuring it in *grains*, whereas in reality it is an almost colorless *liquid*. When cornered, these people resort to the expression "Every man has a right to his opinion," but as to the statement of facts and harmfulness in the use of tobacco, "Every man" assuredly has no such right, for only the findings of those who have made thorough laboratory investigations, physicians who have studied effects by close clinical observation are worth serious consideration. It is here of interest to learn that an instructor at John Hopkins Medical School stated, "I have yet to see in a clinic or a pathological laboratory any evidence to condemn tobacco in any form."

In fact, the opponents resorted to cruel statements, that could only originate in the minds of visionary fanatics, endeavoring to impress immature minds incapable of judging for themselves. Some of their statements, so overdrawn, and at times so absurd, when brought to the attention of the general public, should be of great benefit to the manufacturers of tobacco by showing how far these anti-cigarette fiends will go to try to prove their untrue statements. "Fiends" is here used advisedly, for what could be more cruel than some of these published statements? For instance, at a certain meeting of "The Epworth League" at Denver, Colorado, an individual was allowed to deliver himself of the following: "Tobacco farmers are scoundrels, tobacco merchants are villains, all tobacco dealers and users are rogues and scamps." Mr. Elbert Hubbard, a year or two before his tragic death by drowning, published an article in one of our best known magazines entitled, "The Cigarette Habit," illustrated with a picture of a youth with cigarette in hand, surrounded with grinning skeletons and emaciated horrors, better suited as a frontispiece of "Dante's Inferno." Under this picture appear the words: "Hands that already play the devil's tattoo and roll cigarettes; these are the hands

that forge your name and close over other peoples' money." Remember, these statements were made solely and alone because the youth smoked cigarettes. Here are a few more of Elbert Hubbard's statements as to the *moral* effect resulting from the use of tobacco, "A loss of moral and mental control." "The first indication of degradation is in the youth's secretiveness." "For the young man who has become so calloused that he smokes cigarettes in the presence of his mother, sister, or sweetheart, there is little hope." "The poison has already tainted his moral nature, and for him the work of dissolution, disintegration and degradation has begun. He is defective—a physical, mental and moral defective. Cigarettes stupefy the conscience, deaden the brain, place the affections in abeyance and bring the beast to the surface." According to a newspaper dated February 16, 1916, "The Reverend Dr. Sunday preached a sermon to fourteen thousand Trenton women advising girls not to marry cigarette smoking, cussing libertines." Why cussing libertines?

It would be unnecessary to regard such statements seriously except that so many "old women" of both sexes will believe anything they see in print and that agrees with their preconceived ideas. The following are a few of the objections that have been made as to the use of tobacco. In replying to these and answering questions, it has been suggested that I had no more right to an expression than others, as this is partially true. I have for the most part quoted those who were the best qualified to judge by observation, study and laboratory investigation. As to the moral effect, of course it is impossible to reply, for to those who regard cigarette smoking as an abominable sin as Elbert Hubbard has said, "a habit that leads to degradation, disintegration and dissolution" it is a matter of opinion and unanswerable, therefore I will have to confine my remarks as to use of tobacco to its physical effect alone.

Some years ago a pamphlet was given to the students in a grammar school in Baltimore, Md., stating "tobacco is a powerful narcotic containing a substance called nicotine, a single drop of which placed on a dog's tongue will soon kill him—an ordinary cigar contains enough nicotine to kill two men if taken pure." One of the best known chemists and teachers at Johns Hopkins University, Baltimore, Md., who stated he never smoked or tasted liquor in his life (notice this particularly, for surely

he is an unprejudiced judge) declared in the *Maryland Medical Journal*, March, 1906, "Here are three little sentences containing four big lies. Tobacco is not a narcotic. Nicotine will not kill a dog in the manner described and an ordinary cigar used in the ordinary way, containing its usual amount of nicotine, will not kill two flies." After this statement it is needless to say the pamphlet "Containing the four lies" was quickly suppressed.

We often hear the statement that cigarettes are adulterated with poisonous drugs yet Dr. H. W. Wiley, formerly Chief Chemist of the U. S. Agricultural Department, the man above all others opposed to adulteration in any form, has declared in print and to me personally "I have had tested ten samples of cigarettes purchased in the open market at different places and found them entirely free from arsenic, opium or any other drug." Professor Kennicott, of Chicago, and Dr. J. F. Babcock, professor of chemistry, Boston University, and other investigators have found the same results in their examinations of cigarettes. Then, too, it would surely be an absurd financial venture for a manufacturer to add sufficient drugs to the tobacco to have an appreciable effect upon the smoker for the cost of the adulteration would be many times that of the tobacco itself. "Is it not true that cigarette smokers always prefer certain brands; does this not prove there is something in the cigarettes besides tobacco?" There are many reasons for this preference. Manufacturers have certain blends known only to themselves, that is tobacco of certain age, grown in different parts of the world that have different flavors. These are mixed in different proportions, then at times such a substance as licorice (an entirely harmless ingredient) may be added to give the taste the smoker prefers. Here is an example, according to a magazine article. A certain manufacturer wished to give a rich "pound cake flavor" to his cigarettes; failing to obtain it himself, he consulted an expert chemist. Eventually he received a reply "I examined cigarettes that came fairly close to the ideal flavor wanted and found that licorice had been used after it had been made hot." This was the secret of the particular flavor desired.

Granting nicotine to be a violent poison, "Is it not dangerous to allow even the smallest quantity to enter the system?" This question

is of course absurd for there are many dangerous drugs prescribed by physicians for our health's sake. Even much of our daily food and drink contain deadly poisons. A very active poison can be extracted from potatoes and many other foods. Caffeine, the active principle of coffee, and theine, derived from tea when taken in large amounts, cause insomnia, palpitation, stomach troubles, and emaciation, yet there is no active crusade against the use of tea and coffee. Even the air we exhale contains an active poison, carbonic acid gas, but fortunately, when we take small quantities of drugs, use moderation in our eating, drinking and smoking, we do not absorb sufficient poison to harm us.

One of the most vicious and harmful statements about the use of tobacco is to compare it with the morphine habit. Elbert Hubbard declared: "The choice between cigarettes and daily doses of cocaine, morphine or bromide (sic) is very light."

Now let us suppose a youth easily stops the use of tobacco; he may have to consult a physician who gives him morphine to relieve severe pain, or use cocaine locally for some surgical operation. Finally, the boy may take either of these drugs himself. Believing implicitly in Hubbard's statement he is not afraid, for he has been told he could give up the drug as easily as he did cigarette smoking, but can he? Assuredly he can not. He could no more voluntarily abandon the use of morphine, after having become accustomed to it than he could stop breathing. Then the youth awakens declaring: "Those anti-cigarette fiends taught me I could give up one habit as easily as I could the other, now see my condition in believing such false statements." So Mr. Hubbard's statements are not only untrue but vicious, causing such a youth irreparable harm.

Here are several amusing statements, though made in all seriousness. A certain good man declared "I believe the advanced age of men mentioned in the Bible would not be so uncommon today but for the hot nicotine fumes with which so many now poison themselves." He means "hot air" of course, for heat destroys most of the nicotine tobacco contains.

It has also been said "Tobacco smoking causes great heat of the body, this gives rise to violent fever and causes the blood to rush to the roots of the hair and destroys them. This

is the reason we see so many bald heads among the men but notice women are not bald because they do not smoke." Don't they, indeed? Many ladies do smoke, and but for convention's sake there is no reason why they should not. Truth to say, there is absolutely no proof that smoking in moderation will harm one sex more than the other. The mere statement to the contrary is not proof. Suffragists particularly must agree if men may smoke without actual disgrace, surely women may do so for what is permissible for the gander should be allowable for the goose. Even elderly women smoke. According to an associated press report, "At a poor farm in Minnesota, provision is made for a smoking room for the old women who all their lives have been accustomed to their pipe." Let us hope these old ladies have continued to enjoy their pipe in peace without the interference of so-called reformers and molly-coddles of both sexes, or pestiferous legislation. According to another newspaper statement in Washington, Indiana, a Mrs. Denny celebrated her hundredth birthday in July, 1917. She states that she has walked without a cane, does not wear glasses, traveled over twelve states, usually behind a team of oxen, and has used tobacco since she was sixteen years of age, declaring "the use of tobacco has kept me alive."

A friend now over eighty years of age, with an erect figure, a complexion any young girl might envy, not the slightest manifestation of nervousness in any form, as active as a man of forty, who made a second marriage after he was seventy years of age, and is supremely happy and contented, has daily smoked strong cigars since early youth.

An acquaintance wishing to prove the enormous amount of nicotine contained in cigarette smoke had me slowly blow it through a handkerchief. A yellow stain was left on the linen; of course this was simply the coloring matter in the tobacco. If it had been nicotine, one breath of a cigarette would have caused death. Then, too, nicotine is not yellow, but is an almost colorless liquid. This person also declared clergymen and physicians seldom used the weed. It has been my privilege to be intimately acquainted with many clergymen; and in the privacy of their homes and in the clubs, those who smoke average about as many as men in other walks of life. Of course they do not indulge in this pleasure before their women parishioners or upon the streets. Con-

vention prevents this. Having practiced medicine for thirty years, knowing many hundreds of physicians in different cities, I state three-fourths of all practitioners of medicine use tobacco in some form, many of them smoking cigarettes exclusively. Such a large proportion use tobacco because the vast majority of the medical profession believe that smoking in moderation never causes any ill effects. The *London Lancet*, recognized as the most authoritative medical journal in the world, after thoroughly investigating the results of the use of tobacco, declared: "Cigarette smoking is the least injurious form of tobacco in use."

Professor Bain, in his interesting pamphlet on the use of tobacco, declares science is almost unanimous as stamping the cigarette as "a form of tobacco, in the use of which ill or undesirable effects upon the body or mind, are practically nil."

In my individual experience, about twenty-five years ago I believed I was suffering from a condition popularly known as "Tobacco heart" resulting from smoking cigarettes. I consulted the best known, best informed diagnosticians in the country, Dr. DaCosta of Philadelphia, and the elder Dr. Loomis of New York City, who informed me I had no serious trouble of the heart, that probably the symptoms of which I complained were brought on by the excessive drinking of coffee. Dr. Loomis advised me to continue my smoking, stop the coffee, and report to him in a month. In the meantime, all disagreeable symptoms had disappeared, though I had continued to smoke twelve to fifteen cigarettes a day, and so have continued for the last thirty years, with no return of the "heart trouble" but, if I drink a cup of black coffee, in a short time I have a disagreeable sensation about the heart. In other words, the majority of those who believe they have a condition known as "tobacco heart" are really suffering from the effects of coffee. Dr. Loomis also said: "I consider the cigarette the least harmful use of tobacco. One is poisoned by the use of tobacco, if ever, by the amount of nicotine his system absorbs; he will get more of this by chewing, than from a pipe, next a good cigar, finally from cigarettes, even plus inhaling."

Cigarettes are said to harm the throat and the voice. If this is true, is it conceivable that the greatest opera singers in the world habitually smoke? Caruso is said to have

smoked many cigarettes a day, even between the acts. Would this great tenor, receiving the enormous salary he did, have run the risk of harming his voice by indulging in cigarette smoking, unless he knew by years of experience that they did him no harm? This is not alone applicable to Caruso, for it is well known that the majority of those who are famed for their voices on the operatic stage smoke cigarettes, many women as well as men.

Another tobacco smoker states: "I have been told even by physicians that the use of tobacco leads to organic diseases of the heart and lungs, and causes cancer, and even death may result from its use." I doubt if any regular practitioner of medicine would make such a statement before a medical association as to death being directly caused by smoking. No board of health would accept such a statement. It has been found that even direct applications of nicotine to the heart itself do not affect its pulsation.

The false statement has been made and reiterated that the use of tobacco leads to mental troubles, even to insanity. Professor John Bain, Jr., in his excellent treatise entitled "Cigarettes in Fact and Fancy" declares that "The Medico-Legal Society of New York sent inquiries to the superintendents of insane asylums in this country and abroad, as to the possible relationship between cigarette smoking and insanity. Several hundred replies were received. Every one, without exception, declared that not a case of mental disturbance had ever been traced to the use of tobacco in any form."

Professor C. E. Nammalk, M. D., LL. D., physician to Bellevue and St. Vincent Hospitals, New York City, says: "I am convinced that moderation in the use of tobacco is not attended by any of the dangers which fanatics ascribe to its use."

Dr. Wm. B. Fletcher, in a scholarly paper on the use of tobacco, read at the Mississippi Valley Medical Association, held in Indianapolis, 1905, declares "In the last twenty-two years I have examined over twelve hundred cases brought to the General Hospital for the Insane, and in my private practice where the cause of the malady was given as 'the cigarette habit.' In not a single case have I reason to believe that tobacco had anything to do with the disease."

Finally, if those who condemn the use of

tobacco would only try a smoke, would fill and light their pipes and take their ease, we would hear less complaint from them, for then surely they would appreciate the words: "The pipe draws wisdom from the lips of philosophers and shuts the mouths of the foolish." Ye who condemn tobacco put this in your pipes and smoke it, remembering Carlyle's advice: "Tobacco should be an incentive to silence, not to speak a word more than one has got to say." I light my pipe, gaze upon the glowing logs, and dream, sincerely hoping that anti-tobacco zealots may soon learn the error of their ways and be more charitably disposed towards those they have so strenuously condemned.

1311 K Street, Northwest.

PELVIC STONE, WITHOUT SYMPTOMS, WITH COMPLETE RENAL DESTRUCTION.*

By W. T. GAY, M. D., Suffolk, Va.
Junior Surgeon and Urologist to Lakeview Hospital.

We are more or less familiar with the majority of typical cases of pelvic stone, and while we are ever on the alert to find some improvement in the method of diagnosis and treatment of the typical case, we owe it to ourselves and to the patient to spend much time and thought with the atypical—the case which presents only a few or very indefinite symptoms. With this thought in view, I will give below a more or less detailed report of a case falling in this category, with the hope that it will be of some practical benefit when similar cases are encountered.

The subject of the paper is a little misleading, because there were symptoms, but symptoms which pointed away from the real pathology rather than to it. With the history and symptoms that the patient gave, and being in the class of the fair, fat, and forty, it was quite natural to try to make her have a diseased gall-bladder; but such was not the findings, as we will see below.

Case No. 3296. A white, married, female patient, age fifty-three, was admitted to Lakeview Hospital on March 15, 1922, complaining of discomfort in right abdomen, with marked weakness and fever.

Family History.—One sister died at the age of 55, from cancer of the breast. One sister now living has tuberculosis.

Past History.—She had the usual diseases of

*Read before Southside Virginia Medical Society at South Hill, Virginia, December 12, 1922.

childhood, and attacks of rheumatism, bronchitis, some digestive disturbance characterized by gas, belching and bloating. Married thirty-one years—two children living and healthy. Miscarriages fourteen. Menopause three years ago.

Genito-Urinary History.—Had never at any time in life had any urinary disturbances, kidney colic or pain in kidney region.

History of Present Illness.—For the past four years she noticed at frequent intervals a slight discomfort in right abdomen anteriorly. Recently there has been some soreness in right lumbar region, extending across crest of ilium and deep down in right abdomen anteriorly. For the past several months has noticed a marked weakness and fatigue coming on after slight exertion. For the past month has been having fever daily, ranging from 99 to 101. Two days before admission, developed a severe cold, with temperature 102, cough and soreness in chest.

Physical Examination. — Showed a very corpulent woman weighing 220 pounds, which is her average normal weight. Skin very pale, dry and rough. Cheeks flushed. Heart sounds very distant with a soft systolic murmur at apex, not transmitted. Blood pressure—diastolic 85, systolic 150. Definitely diseased tonsils. Lungs showed a few scattered rales over the upper right chest. Slight tenderness in right abdomen just external to G. B. region. Slight tenderness on deep pressure in lower part of right lumbar region, otherwise the examination was negative.

On day of admission she gave a turbid urine, specific gravity 1016, acid reaction, much albumin and pus, R. B. C. 5,012,000, W. B. C. 14,400, Polys 70, lymphs 30, HB. 65.

X-ray Examination.—Showed a stone about one-half inch in diameter opposite the third lumbar vertebra and two inches from mid-line.

Cystoscopic Examination.—Bladder mucosa normal. Urine in the bladder turbid and full of flakes and shreds. Left ureteral orifice normal in size, position, and appearance; catheter passed without obstruction. Urine excreted with normal rhythm and frequency, P. S. P. time six minutes, forty per cent eliminated in two hours. Considerable pus from left side. Right orifice contracted, catheter met obstruction in pelvic portion, which obstruction could not be passed by catheter. No urine coming from this side. One week later cystoscopic and X-ray examinations gave the same results.

Being a poor surgical risk and having considerable pus coming from the left kidney, operation was delayed with the hope of bettering her condition. However, in spite of all palliative treatment, she continued to run a septic temperature, ranging from normal to 102°, with a gradual rise in the leucocyte count. At the end of three weeks pain in the lumbar region became slightly more marked and you could now palpate a mass low down in this region. The leucocyte count went up to 18,800 and the patient showed marked signs of growing worse, so it was decided best to drain this mass under local anesthesia. A thick, creamy pus was liberated from a honeycombed abscess, the origin of which was not determined.

Improvement was immediate and rapid: at the end of three weeks her general condition was markedly improved. T. P. R. normal; P. S. P. elimination seventy per cent; urine practically free of pus, but the sinus leading to abscess cavity continued to discharge much pus.

On cystoscopic examination the ureteral catheter now easily passed the right ureter to the kidney pelvis. Still no urine came from this side. A pyelogram was made, 45 c.c. of fifteen per cent sodium bromide solution being run into the right pelvis without any discomfort to the patient. The X-ray plate showed the left ureter to be in a normal position, while the right passed markedly to the right with a wide curve outward then turning inward terminating about two inches lateral to the level of the third lumbar vertebra. The opaque solution showed a contracted and low pelvis with rounding of the calices and pocketing. The shadow then extended downward and outward where it took on a narrow linear appearance for about two inches when it again ballooned out as a large irregular cavity corresponding with the position of the previously drained abscess.

One week later a right nephrectomy was done. In the lumbar region on a level with the crest of the ilium was found a mass of fatty and connective tissue, oval in shape and one-half size of a normal kidney. The only structure remaining that could possibly be recognized as kidney substance, was an ill-defined poorly developed kidney pelvis which contained one stone 2.5x1.5 cm. Above and entirely separate from the first mass was a second which was about half the size of the first. This, the remains of the suprarenal, was

soft and slightly cystic. Microscopic sections showed an occasional cell resembling lining cells of kidney tubules, otherwise there was an entire absence of tissue resembling kidney. The second mass showed scattered areas of fairly normal adrenal structure. There was no evidence of tuberculosis or malignancy in either section.

The patient made a good post-operative recovery with a rapid and complete healing of the wound. Tonsillectomy was performed three days before discharge. When last seen, four months after discharge, she was entirely free of symptoms, urine negative, and had regained her normal weight.

CONCLUSIONS.

The failure of the catheter to pass right ureter on the first examination was due to the pressure of the lumbar abscess with distortion of the ureter.

The development of the abscess was what forced the patient to seek relief. This abscess, which was very slow of development, was secondary to the infected and functionless kidney which no doubt extended over a period of years and had been neglected because attention had not been directed to the urinary tract.

There was a large stone (2.5x1.5 cm.) in pelvis of kidney which had never given rise to any kidney colic. It is possible this may have developed after the kidney ceased to function.

There was an entire absence of any urinary disturbance at any time during the life of the patient. We get the first knowledge of her true condition when we examine the record of urinalysis and find the urine loaded with pus and albumin.

Anyone of us can make the simple urinary tests and, if made as a more routine part of our everyday practice, it would often lead to an early diagnosis or point out the direction in which we must investigate in order to make a diagnosis that will enable us to offer some hope of relief before the damage is beyond repair.

ALL LIT UP.

A little girl, brushing her hair, found that it "cracked," and asked her mother why it did.

"Why, dear, you have electricity in your hair," explained the mother.

"Isn't that funny?" commented the little one. "I have electricity in my hair, and grandmother has gas in her stomach."—*Exchange*.

Analyses, Selections, Etc.

SCIATIC HERNIA.

A Report of a Case of Hernia of Meckel's Diverticulum Through the Greater Sciatic Foramen.

By JOHN W. BRODNAX, M. D., Richmond, Va.

Associate Professor of Anatomy, Medical College of Virginia.

Of all forms of hernia the sciatic type is one of the rarest, or, at least, it would appear so, if the number of recorded cases can be taken as an index to the frequency of their occurrence. A careful search of the literature on this subject reveals the fact that less than thirty cases have been reported up to the present time, and of these only one has been contributed by an American surgeon. It is to Dr. John Edward Summers¹ of the University of Nebraska that credit is due as the first surgeon in this country to report a case of sciatic hernia. In a very excellent paper on this subject, read before the Western Surgical Association, December 9, 1921, Dr. Summers describes a case of sciatic hernia complicated with myxomatous tumor of the scrotum. This case, as far as available literature at my disposal is concerned, constitutes the only one recorded in this country. Possibly other cases have been reported. If so, I have been unable to find any mention of them.

In sciatic hernia the intestine, or whatever structure it might be, for it may contain any viscus or organ sufficiently movable to reach and pass out of the pelvic cavity, escapes through either the greater or lesser sciatic foramen. This part of the pelvic wall presents three weak spots and, anatomically, it is possible for hernia to take place through any of these places. The greater sciatic foramen is filled-in by the pyriformis muscle which has a small slit-like cellular interval, both at its upper and lower borders. Hernia may occur through either of these intervals, or it may pass through the lesser sciatic notch, which represents the third weak spot. After passing out of the pelvic cavity it presses beneath the gluteus maximus muscle and, if small, may remain under cover of that muscle and escape detection, or it may reach such proportions as to form in the gluteal fold a well marked tumor. "In all cases through whichever opening the hernia passes it must always have the sacrotuberous ligament below it." This is an

important point in differentiating sciatic hernia from a perineal hernia. In the latter, the sacrotuberous ligament, which is easily felt, lies above the hernial opening. Garre² likens the sacrotuberous ligament in this respect to the inguinal ligament in distinguishing between inguinal and femoral hernia.

Probably chiefly on account of the rarity of sciatic hernia, comparatively little is known of its etiology. One case reported in 1873 by Crossle³ is of particular interest in as much as it gives a clear history of the cause. This case occurred in a woman who, while in the act of lifting a heavy iron plow into a cart, became suddenly conscious that something had given way in a situation deeply seated, where she later discovered a small tumor about the size of a pigeon's egg, situated on the margin of the gluteal fold on the same side. This tumor gradually increased in size until, when it was examined by Crossle, it had reached the size of a foetal head "at term."

Of the recorded cases two-thirds of them were in females. The greater frequency in

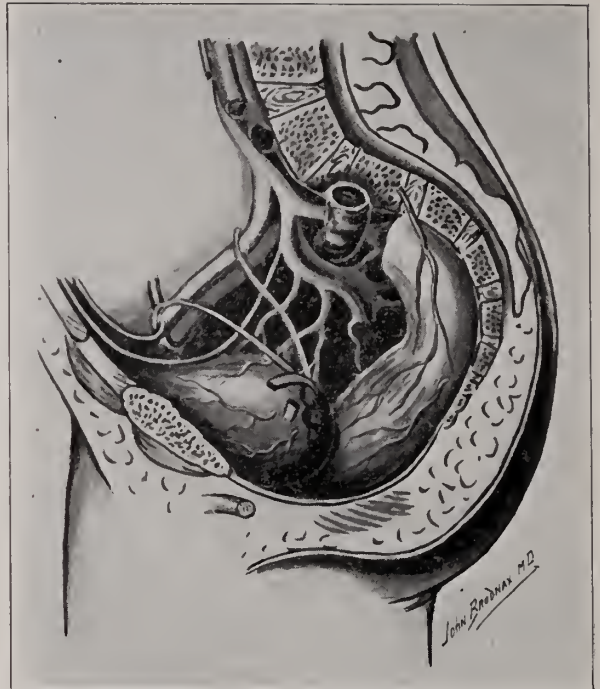


Fig. 2. Sciatic hernia as seen from the exterior of the pelvis.

that sex may be accounted for by the fact that the sciatic foramina are slightly larger and the sacrotuberous ligaments longer and more lax in females than in males. Doubtless, also, the ill effects of pressure and trauma attendant on labor predispose women to this form of hernia. "Sciatic hernia occurs more frequently on the right side than on the left, having been observed on that side ten times out of fourteen cases. M. Koppl has noted nine case of strangulation out of the twenty-six cases published in the literature."

Although Sir Astley Cooper⁴ is generally credited with having reported the first case of sciatic hernia in 1800, the literature shows that fifty years earlier, in 1750, a German physician of the name of Papen describes a case which came under his observation, in a letter addressed to the Swiss physiologist, Haller.

The case which I report tonight came under my observation in the dissecting hall of the Medical College of Virginia in 1922, and consequently nothing of the personal history of the individual is known. The subject was a negro convict, nineteen years of age, who came to his death by a gunshot wound of the chest, received while he was attempting to escape from the convict road force in one of the counties of the State.

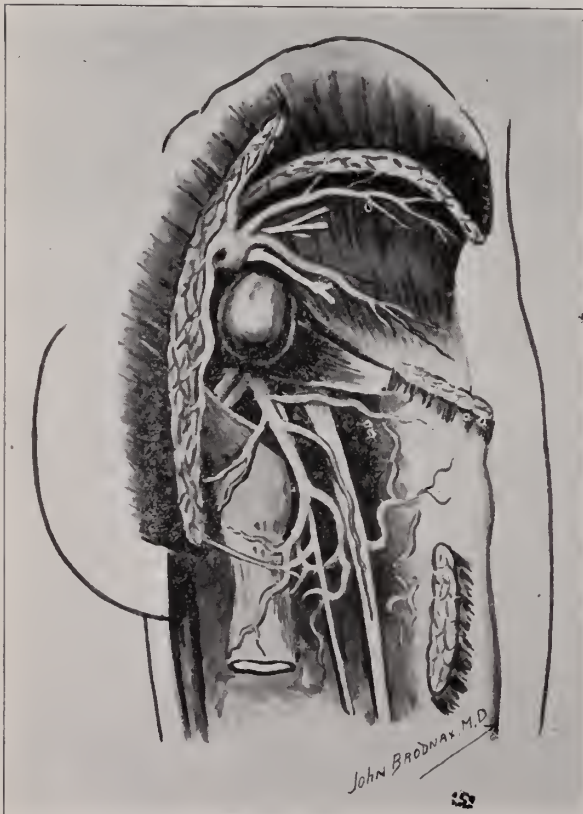


Fig. 1. Sciatic hernia as seen from the interior of the pelvis.

Not anticipating any abnormal condition in the pelvis, the contained viscera had been much disturbed before the hernia was discovered. I noticed, however, an unusual quantity of small intestine in the pelvic cavity, which at first appeared to be bound down by adhesions, but a more careful examination showed the anchorage to be due to a herniated Meckel's diverticulum through the greater sciatic foramen. The diverticulum, which was about 10 centimeters in length, was attached to the ileum about two feet from the ileo-caecal valve. At its point of origin the ileum was slight-narrowed and markedly kinked. The gut passed out through an opening about 15 millimeters in diameter above the pyriformis muscle and in front of the superior gluteal vessels and nerve, and ended in a globular tumor about the size of a hen's egg, which rested upon the dorsal surface of the pyriformis entirely under cover of the gluteus maximus muscle. There was no visible surface enlargement and, in all probability, the individual was never aware that such a condition existed. I show

two drawings of this case which give you a better idea of the character of the hernia than a written description. The other drawing is a copy of the illustration of the Crossle case, which was published in the reports of the Dublin Pathological Society in 1873, and which has been frequently used in text books since that time as an illustration of sciatic hernia.

As previously stated, Dr. Summers' case, as far as I have been able to ascertain, is the only case up to this time that has been reported in America, and the one I report tonight stands second, with the unique feature of being the first recorded case of sciatic hernia where Meckel's diverticulum formed the herniated mass.

BIBLIOGRAPHY.

1. Annals of Surgery, Vol. LXXV. 1922.
2. Die Hernia Ischiadica, Beiträge zur klinische Chirurgie, Vol. IX.
3. Transactions of the Dublin Pathological Society, 1783.
4. Anatomical and Surgical Treatment of Abdominal Hernias, by Sir Astley Cooper.

(Selection from *Journal of the A. M. A.*, Feb. 9, 1924).

Correspondence.

Effect of Freezing on Toxin-Antitoxin Mixture.

February, 1924.

TO THE EDITOR:

There appeared recently in some of the daily papers of Virginia a news item in regard to the occurrence of twenty cases of illness in Concord, Massachusetts, following treatment with toxin-antitoxin. Inquiries were at once instituted to ascertain from the Department of Public Health of Massachusetts the circumstances attending these cases of illness. The pertinent portions of the reply from the Massachusetts authorities were as follows:

"Our first report of reactions came from the Concord Board of Health. Upon receipt of this report which stated that severe reactions had been observed in a small group of school children following immunizations with toxin-antitoxin, an immediate investigation was made to determine if possible the source of the trouble. This investigation brought out the fact that the toxin-antitoxin which was used on Wednesday of last week had become frozen during the extreme cold of the preceding Saturday and Sunday. A similar experience

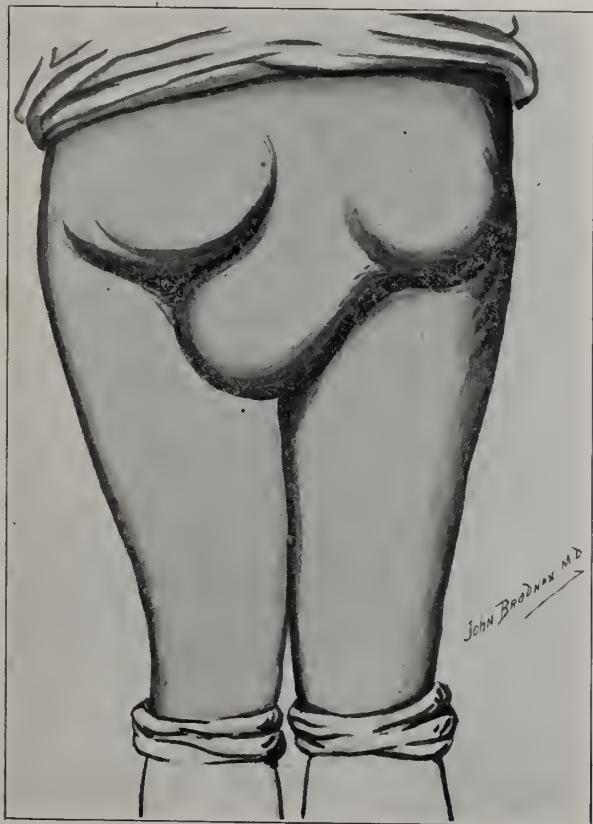


Fig. 3. Drawing of case of sciatic hernia reported by Crossle.

has been reported from Bridgewater where twenty severe reactions followed the injection of some frozen material, and one case each has also been reported from Holyoke and Boston.

"The lots of toxin-antitoxin mixture in question had satisfactorily passed all laboratory tests and had been tested and approved by the Federal Government, and with thousands of doses of these lots which had been given throughout the State the only reactions occurred with the material which was known to have been frozen after delivery.

"A member of the staff of the United States Hygienic Laboratory has been asked to make a complete investigation of the matter, and Dr. William Park, Dr. Bela Schick, Dr. M. J. Rosenau, Dr. Hans Zinsser and Dr. Edwin H. Place have been called in consultation in order that everything possible might be done for the patients.

"Experiments already carried out at the State Antitoxin and Vaccine Laboratory show that the reserve stocks of the particular lots used are still entirely satisfactory in every way, but that freezing alters this product, causing it to develop a toxicity which it did not originally possess.

"All toxin-antitoxin which had been distributed previous to or during the recent extreme cold spell has been recalled and all boards of health in the State have been requested to notify physicians of the possible danger attending the use of any product that might have been frozen, with the request that they also return to the laboratory any of this material now in their possession."

Toxin-antitoxin is now being administered to 2,000 or more children a month in the State of Virginia and it is very important that the experience of the Massachusetts Department of Public Health should be borne in mind. There is very little danger of the mixture freezing in transit through the mails in Virginia, but instances have already occurred where the material was allowed to freeze after the package had been opened and a portion of it had been used. In the interest of safety such material must be discarded.

The most satisfactory results will be obtained if toxin-antitoxin and similar biological products are kept in a refrigerator. This precaution will avoid deterioration by warmth or by extreme cold.

GEORGE C. PAYNE, M. D.,

Epidemiologist, Va. State Board of Health.

The Truth About Medicine

In addition to the articles enumerated in our letter of December 29, 1923, the following have been accepted:

Abbott Laboratories:

Potassium Bismuth Tartrate—D. R. L.

Ampules Potassium Bismuth Tartrate with Butyn—D. R. L., 0.1 Gm.

Ampules Potassium Bismuth Tartrate with Butyn—D. R. L., 0.2 Gm.

Britt, Loeffler and Weil:

Loefflund's Malt Soup Stock (Dr. Keller's Formula).

Hynson, Wescott and Dunning:

Flumerin—H. W. and D.

Lederle Antitoxin Laboratories:

Corpus Luteum—Lederle.

Corpus Luteum Extract—Lederle.

Ovarian Residue—Lederle.

1 Per Cent. Silver Nitrate Solution—Lederle.

Whole Ovary—Lederle.

Parke, Davis and Co.:

Ergot Aseptic

Ampules Ergot Aseptic 1 Cc.

Scarlet Red Sulphonate—P. D. and Co.

Scarlet Red Emulsion, 4 per cent.—P. D. and Co.

Scarlet Red Ointment, 5 per cent.—P. D. and Co.

Scarlet Red Ointment, 10 per cent.—P. D. and Co.

NEW AND NON-OFFICIAL REMEDIES.

Potassium Bismuth Tartrate—D. R. L.—A basic potassium bismuth tartrate containing from 64 to 69 per cent of bismuth. For a discussion of the actions and uses, see Bismuth Preparations in the Treatment of Syphilis (Journal A. M. A., August 25, 1923, p. 661). Potassium bismuth tartrate—D. R. L. is supplied only in the following forms: Ampules potassium bismuth tartrate with butyn—D. R. L., 0.1 Gm. (containing potassium bismuth tartrate—D. R. L., 0.1 Gm. suspended in 2 Cc. of a 0.6 per cent. solution of butyn in a fixed oil); Ampules potassium bismuth tartrate with butyn—D. R. L., 0.2 Gm. (containing potassium bismuth tartrate—D. R. L., 0.2 Gm. suspended in 2 Cc. of a 0.6 per cent. solution of butyn in a fixed oil). The product is administered intramuscularly. The Abbott Laboratories, Chicago.

Scarlet Red Sulphonate.—The sodium salt of azobenzene-disulphonic-acid-azobetanaphthol. The actions and uses of scarlet red sulphonate are essentially the same as those of scarlet R medicinal Biebrich (see New and Non-official Remedies, 1923, p. 275). It is marketed only in the following forms: Scarlet red emulsion, 4 per cent.—P. D. and Co., Scarlet red ointment, 5 per cent.—P. D. and Co., Scarlet red ointment, 10 per cent.—P. D. and Co. Parke, Davis and Co., Detroit. (Journal A. M. A., January 19, 1924, p. 269).

Ergot Aseptic.—A liquid extract of ergot containing the soluble constituents of the drug. It is standardized biologically so that 1 Cc. represents 2 Gm. of ergot. The actions and uses of ergot aseptic are the same as those of ergot. The dose is 1 to 2 Cc. injected intramuscularly. Ergot aseptic is marketed only in 1 Cc. ampules. Parke, Davis and Co., Detroit.

Loefflund's malt soup stock (Dr. Keller's formula).

—A preparation essentially similar to extract of malt U. S. P., but containing a small amount of potassium carbonate. Loefflund's malt soup stock is designed for use in preparing the malt soup of Dr. Kellner. Britt, Loeffler and Weil, New York. (*Journal A. M. A.*, January 26, 1924, p. 303).

PROPAGANDA FOR REFORM.

Intarvin.—Because of numerous inquiries, the Council on Pharmacy and Chemistry publishes a preliminary report on Intarvin. The product is marketed by the Intarvin Company, Long Island City, N. Y. Dr. Max Kahn has applied for a patent on it. Many statements have been given the lay press by those interested in the promotion of Intarvin, but as yet no publication has appeared in the medical press, except preliminary reports by Kahn. Intarvin is proposed for use in diabetes or in conditions where acidosis occurs. It is a synthetic fat which, it is claimed, can be assimilated by the diabetic without the production of products that cause acidosis, as is the case with ordinary fats when these are consumed by diabetics. Intarvin is stated to be the glyceryl ester of margaric acid admixed with ten to twelve per cent of liquid petrolatum. While the usefulness of Intarvin is curtailed by the discovery of insulin, it should be valuable in planning a diabetic diet if the claims made for it are substantiated. Intarvin is still in the experimental stage and it is unfortunate that so much newspaper notoriety has been given it. Until acceptable evidence is available for its usefulness, palatability and practicability, judgment of its worth must be suspended. (*Journal A. M. A.*, January 5, 1924, p. 51).

Chemical Foundation Wins.—During the late war, our government seized many German patents on synthetic drugs. Later the Alien Property Custodian, on executive order of President Wilson, sold 4,700 German chemical patents to the Chemical Foundation, Inc. This corporation agreed in turn to license any American firm that could present evidence of reliability in chemical manufacture to manufacture under these patents. As a result of this action, physicians may today obtain different brands of arsphenamin instead of one proprietary "Salvarsan"—and at competitive prices. The same is true of other useful synthetics. About a year and a half ago, President Harding instructed the Alien Property Custodian to take steps to secure the return of all patents sold to the Chemical Foundation, Inc., on the ground that the price paid was inadequate and the transaction illegal. Suit was instituted by the government against the Chemical Foundation, Inc., for the recovery of the patents. The suit was won by the Chemical Foundation, Inc. In the decision of the court, it was held that the price was adequate, for the reason that many of the patents were nonworkable and that, therefore, because of the financial risk and hazard, the value of the patents "was too slight and problematical to warrant the payment by American citizens of a sum even remotely approximating what they might have been worth to the German owners for their monopolistic purposes." Hence, the bill of complaints filed by the government was set aside. (*Journal A. M. A.*, January 12, 1924, p. 130).

The Action of Salicylates, Cinchophen, Neocinchophen and Related Products.—The latest (1923) edition of *Useful Drugs* speaks of the salicylates, cinchophen, neocinchophen and related drugs as "highly efficacious" and "exceptionally efficient" in the management of certain phases of arthritis. The assumption that the drugs exert an etiotropic action

by destroying bacterial agencies responsible for the disease has repeatedly been disproved. They do not function as germicides, for example, in rheumatic fever assumed to be caused by micro-organisms. Recently, Hanzlik and Painter compared the antiphlogistic effect of salicylates, cinchophen and neocinchophen in experimental edema of head and neck. They concluded that the so-called antiphlogistic action of these drugs as exemplified in the prompt amelioration of objective signs of inflammation, including the swelling and edema of the joints, is not due to a direct action on the inflammatory process. Experimental edema of the head and neck in animals was not beneficially influenced by previous and simultaneous treatment of the animals with sodium salicylate, cinchophen or neocinchophen. Negative results with respect to antiphlogistic effects have also been observed in the treatment of other kinds of edema. Consequently it is concluded that the beneficial effects of these drugs in rheumatic fever appear to be produced neither through etiotropic nor organotropic, but rather through symptomatic action, the benefits being mediated through antipyresis and analgesia. (*Journal A. M. A.*, January 19, 1924, p. 213).

Diphtheria Antitoxin for the Infant.—In the presence of diphtheria, no age is a contraindication to the administration of antitoxin. The dose for infants of from ten to thirty pounds and under two years of age, has been given as from 2,000 to 10,000 units. The immunity to diphtheria in young infants seems to depend on antitoxin received from the mother through the placental circulation. This immunity is possessed by more than 90 per cent of children in the early weeks of life, but at the end of a year this has been lost by about half of them. Serums are well borne by young children, as they have little sensitiveness to foreign proteins. A suitable immunizing dose of diphtheria antitoxin for an infant would be from 200 to 500 units, and the therapeutic dose from 2,000 to 10,000 units. (*Journal A. M. A.*, January 19, 1924, p. 228).

Dermatosis From Fur.—Reports have been published of persons who have suffered severe eruptions and irritations of the skin following the wearing of furs. Investigation has shown that these disturbances are caused by paraphenyldiamin, which is used to dye furs black and by quinone, an oxidation product of paraphenyldiamin, which gives a brown color. The untoward effects may be prevented largely by extreme care in the finishing and dyeing processes with special attention to remove all excess dye, and particularly traces of quinone from the fur. (*Journal A. M. A.*, January 26, 1924, p. 307).

Effects of Bromids on Epilepsy.—The harmful effects of the prolonged administration of bromids, aside from the skin and intestinal effects, are gradually increasing dullness, heaviness, torpor, stupidity, with greater self-centering of interests and unintelligence. The size of the dose that is necessary to control the fits is probably an important factor in determining the amount of damage that will be done. (*Journal A. M. A.*, January 26, 1924, p. 325).

In writing advertisers, please mention this journal.

Book Announcements

Pediatrics. By Various Authors. Edited by ISAAC A. ABT, M. D., Professor of Diseases of Children, Northwestern University Medical School, Chicago. In eight octavo volumes, totaling 8,000 pages, with 1,500 illustrations, and separate Desk Index volume free. Now ready, VOLUME I, containing 1,240 pages with 284 illustrations, and VOLUME II, containing 1,025 pages with 180 illustrations. Philadelphia and London. W. B. Saunders Company. 1923. Cloth, \$10.00 per volume. Sold by subscription.

After the lapse of nearly ten years since preparations for Abt's pediatrics were begun, the first two volumes have come from the press. As stated in the preface, this system of pediatrics is a collection of monographic treatises on subjects of interest in the diseases of infancy and childhood. The authors are from every section of the United States, and are all men of eminence, who have made valuable contributions to the literature of the subjects on which they have written in this system.

Volume I begins with a concise history of the "Encyclopedias Which Refer to the Diseases of Children," by Dr. Abt. Following this is a "History of Pediatrics," by Fielding H. Garrison. In this very scholarly and interesting treatise Dr. Garrison traces the progress of pediatrics from the earliest times down to the present day. The subject is handled in a very fascinating manner.

"Congenital and Acquired Predisposition and Heredity," by Clarence C. Little, is based largely on experimental investigations and, though rather technical, should be of considerable interest even to the general reader.

"The Anatomy of the Infant and Child," by Richard E. Scammon, is well illustrated and a valuable article for reference purposes. The subject of "Growth and Development" by T. Brailsford Robertson is well handled.

"Physiology of Metabolism in Infancy and Childhood" is treated in a very thorough manner by John R. Murlin. A very brief discussion of the "Application of Physical Chemistry to the Physiology of Childhood" is given by Jesse F. McClendon. "Hygiene of the School Age," by Josephine E. Young, is a very complete and excellent treatise in which is discussed every phase of the child's activities as related to health. It contains much practical matter that will be of especial interest to the practicing physician.

"Hygiene of the Home" and "Hygiene of Infants in General," by Walter Reeve Ramsey, are brief but practical discussions.

"Climatotherapy," by F. L. Wakeham, contains a climatic description of a number of health resorts, and a too brief discussion of treatment by this agency.

"Hygiene of Crippled Children" is considered in a very short article by H. Winnett Orr.

For the practitioner, Volume II will probably be of more interest than Volume I. Space does not permit a complete list of the subjects discussed. Of particular interest is the illuminating article on "Mortalities of Infancy" by Richard A. Bolt. "Peculiarities of Disease in Childhood," by John Diven, and "Prophylaxis and Treatment" by E. R. Debuys deserve special mention for their excellence. There are valuable articles on "Diseases of the Newborn" by N. O. Pearce and on "Premature Infants" by Julius H. Hess.

The articles on infant feeding, deficiency diseases, metabolic disorders and related subjects are given considerable space and are of a very practical nature.

For a work of this character there is remarkably little repetition.

Though here and there are statements with which some pediatricians will take issue, these two volumes of Dr. Abt's system are of an unusually high calibre and should be in the library of every doctor particularly interested in child welfare. It is hoped that the volumes yet to be published will be up to the high standard set by these two.

J. B. STONE, M. D.

Management of the Sick Infant. By LANGLEY PORTER, M. D., M. R. C. S. (Eng.), L. R. C. P. (Lond.), Professor of Clinical Pediatrics, University of California Medical School, etc., and WILLIAM E. CARTER, M. D., Assistant in Pediatrics and Chief of Out Patient Department, University of California Medical School. Second Revised Edition. Illustrated. St. Louis. C. V. Mosby Company. 1924. 8vo. 659 pages. Illustrated. Cloth, \$8.50.

Practical Chemical Analysis of Blood. A Book Designed as a Brief Survey of this Subject for Physicians and Laboratory Workers. By VICTOR CARYL MYERS, M. A., Ph.D., Professor and Director of the Department of Biochemistry, New York Post-Graduate Medical School and Hospital. Second Revised Edition. Illustrated. St. Louis. C. V. Mosby Company. 1924. 8vo. 232 pages. Cloth, \$4.50.

Geriatrics. A Treatise on the Prevention and Treatment of Diseases of Old Age and the Care of the Aged. By MALFORD W. THEWLIS, M. D., Editor, Medical Review of Reviews; Associate Editor, The Therapeutic and Dietetic Age. With introductions by A. JACOBI, M. D., LL.D., and I. L. NASCHER, M. D., Second Edition, Revised and Enlarged. St. Louis. C. V. Mosby Company. 1924. 8vo. 401 pages. Cloth, \$4.50.

Selected Essays on Orthopedic Surgery. From the Writings of NEWTON MELMAN SHAFFER, M. D., Emeritus Professor of Orthopedic Surgery, Cornell University Medical College; Consulting Orthopedic Surgeon, St. Luke's Hospital, New York, and to the N. Y. State Orthopedic Hospital for Children, West Haverstraw, etc. With forewords by DR. LOVETT and DR. FISHER, and comments by DR. COTTON, DR. NUTT, DR. BLADGEN, and MR. HARDON. Illustrated. G. P. Putnam's Sons. New York and London. The Knickerbocker Press. 1923. 8vo. 636 pages. Cloth, \$5.00.

An Outline of Radium and its Emanations. A Complete Handbook for the Medical Profession. Published by National Radium Products Company, under the direction of VYNNE BORLAND, M.B., Ch.B., B.Sc., Glasgow, Director, Medical Consulting Department. The object of the book is to tell something about Internal Radium Therapy. Paper. 33 pages. Price, \$1.00.

Beginning Again at Ararat. By MABEL EVELYN ELLIOTT, M. D., Medical Director of Near East Relief. With Introduction by JOHN H. FINLEY. Illustrated. New York, Chicago, London and Edinburgh. Fleming H. Revell Company. 1924. 340 pages. Cloth, \$2.00 net.

International Clinics. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles on the Treatment of Medicine, Surgery, Neurology, Pediatrics, Obstetrics, Gynecology, Orthopedics, Pathology, Dermatology, Ophthalmology, Otology, Rhinology, Laryngology, Hygiene, and other topics of interest to students and practitioners. By Leading Members of the Medical Profession throughout the World. Edited by HENRY W. CATTELL, M. D., Philadelphia, Pa., with the collaboration of fifteen eminent physicians and surgeons. Volume IV. Third-third Series, 1923. Philadelphia and London J. B. Lippincott Company. 1923. 308 pages, with a number of illustrations. Cloth.

Genitourinary Diseases and Syphilis. By HENRY H. MORTON, M. D., F. A. C. S., Professor of Genitourinary Diseases and Syphilis in the Long Island College Hospital; formerly members of the Committee on Venereal Diseases in the Office of the Surgeon General, etc. Fifth edition, revised and enlarged, with 328 illustrations and 38 full page colored plates. New York. Physicians and Surgeons Book Company. 353 West 59th Street. 1924. 712 pages. Cloth, price \$10.00.

A Physician's Manual of Vaccine Therapy. By G. H. SHERMAN, M. D. Press of the Bacteriological Laboratories, G. H. Sherman, M. D., Detroit. 160 pages. This manual gives in concise, comprehensive manner data pertinent to the application of bacteriological vaccine therapy in the prophylaxis and treatment of infectious disease.

Awards from the Benjamin Franklin Fund.

Benjamin Franklin spent much time in England from 1757 to 1762 representing the American colonies. While there he placed one hundred pounds in the hands of members of the society of friends as a trust, to be invested with accumulations, for not less than one hundred and fifty years. Thereafter at the discretion of the trustees, awards were to be made from time to time for the most valuable contributions to science considered by them, either manuscript or published, on the subject of cures, but particularly in relation to surgery, the nervous system and part "mind treating" have in the recovery and preservation of health.

Announcement is now made by Roberts Lloyd-Gresham, for the trustees, of the first awards from this fund.

Minor Award, Fusakichi Omori or Tokio, unpublished treatise "The Rotary Knife in Surgery"; Award, Charles P. Steinmetz of Schenectady, privately published treatise, "The Nervous System as a Conductor of Electrical Energy"; Major Award, Pierson W. Banning of Los Angeles, on published work, "Mental and Spiritual Healing; All Schools and Methods; A Text Book for Physicians and Metaphysicians."

The U. S. Civil Service Commission,

Washington, D. C., announces that applications will be rated as received until June 30, 1924, for the following positions:

Medical interne (psychiatric); Medical Officers, junior grade, grade A, and grade B; Graduate nurse; and Reconstruction aide and reconstruction pupil aide in occupational therapy.

Full information about these applications may be received from above named Commission.

How to Plant The Home Grounds.

The Southern Nurserymen's Association, P. O. Box 169, Birmingham, Ala., has issued a number of short articles pertaining to beautifying the home grounds, with special reference to the growing of more fruit for home use. They tell of the kinds and varieties of fruits suitable for home orchards and tell when and where to plant trees and shrubbery to make the home grounds especially attractive.

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MARCH, 1924

No. 12

Editorial

Pernicious Anemia.

Before commenting upon the changes in and characteristics of the blood in pernicious anemia, certain features of the disease may be pointed out. These clinical evidences result from the blood changes. Abnormal blood destruction in the patient brings about more or less characteristic symptoms in the color of the skin, in alterations of the liver and spleen, in febrile reactions and in increased amounts of blood-derived pigments in the plasma and excreta.

The color of the skin is typical lemon color. This hemolytic jaundice may or may not be the first evidence to attract the attention of the patient. In early period of the disease this pallor may not be characteristic; later it becomes so. The degree and intensity of the hemolytic jaundice depends, roughly speaking, upon the degree of blood destruction, but this does not always follow. An absence of pallor does not preclude advancing hemolysis. The saturation of the skin with pigments is an associated factor that enters into the intensity of the icterus.

In a report of a group of cases from Johns Hopkins Hospital in which there was an analysis of the clinical histories of 111 patients with pernicious anemia, 2.7 per cent showed "good" color, while the remaining 97.3 per cent showed discolored skin, described as "pale yellow with brown tint, lemon yellow, sallow, ashen, icteroid tint, pale and slightly yellow."

The spleen and liver present rather constant changes in pernicious anemia.

The spleen is particularly associated in the process of increased blood destruction. The spleen shows a high degree of vascularity and blood engorgement in the pulp areas in contact with the connective tissue spaces, while the sinuses are rather empty. Here the hemolysis occurs, it is believed; hemolysis occurs also in the liver and in other parts of the body as well. In the Johns Hopkins report, however, in 80 per cent of the patients the spleen was not palpable; in 5.4 per cent increased splenic dullness was recorded; and in 19 per cent the spleen was recorded as palpable. Another observer states that in about 40 per cent of the cases the spleen is enlarged to the degree that it is palpable.

The liver is enlarged in pernicious anemia, the degree probably varying with the stage. In the Hopkins cases (111 cases—histories studied) the liver was recorded as enlarged in thirty-seven cases. The dual enlargement of liver and spleen, doubtless, occurs.

Fever. The temperature of the body is usually above normal showing highest variations from normal during stages of hemolysis, or so-called relapses. This is not invariably the rule, however. It is an irregular fever of low grade, sometimes characterized by a high swing.

Condition of Teeth. In the Hopkins cases 14.4 per cent (of 111 cases) had had all teeth extracted; 25.2 per cent had good teeth; 67 per cent had bad teeth.

The Tongue and Mouth. In about 45 per cent of cases the tongue and mouth symptoms appear. This usually consists in soreness, rawness, sensation of burning, particularly on the anterior half of the tongue. The tongue is red and dry, superficially ulcerated. Glossitis is constant. The mucosa of the mouth presents the same process.

The Stomach. The occurrence of a diminished hydrochloric acid in gastric secretion is common. In fact, the patient frequently applies for treatment because of stomach trouble, complaining of loss of appetite, heartburn, nausea, vomiting, diarrhea, colicky pain in stomach and intestines. The blood picture may be wanting in all confirmatory signs of pernicious anemia, although the mouth and stomach symptoms are marked. Progressive blood

destruction brings forward characteristic blood picture.

The Course. The disease is characterized by remissions and relapses. They have recently been divided into following groups—

- (a) Acute: progressively downward;
- (b) Milder: marked by fair remission with hemolysis absent during remission;
- (c) Considerable degree of hemolysis with slow and mild remissions, with serious relapses;
- (d) Chronic: slow progress downward, with mild remissions;
- (e) Continuously chronic, progressing very slowly on downward course.

The Causes. Much has been written on the etiology, but we do not know the cause, or causes. (a) "A reversion of the hematopoietic functions to a somewhat embryonic type;" (b) "Dietary hemolytic toxins produced in the process of intestinal putrefaction;" (c) "Infective disease of unknown etiology;" (d) "Altered lipid metabolism or a condition of hypersplenism;" (e) "Unsaturated fatty acids" acting as hemolytic poisons; amino acids acting as hemolytic agents—are a few of the explanations offered for the chronic hemolytic anemia, known as pernicious anemia.

The Blood. The blood system is a primary and a fundamental consideration. In this system, apparently, are found the most emphatic and important changes. Probably, all symptoms arising from other systems of the body, named and not named in the foregoing sketch, depend upon blood changes which are found in nearly all cases, at least, in advanced stages of the disease.

Red Blood Cells. The count of red blood cells may go to five million. Two million or less is usual count, varying with stage of the disease. Patients with a count of between five million and two million may enjoy fair strength, although patients may die with count around three million. The change for the better in count may mean an increase in number of cells, due to cessation of hemolysis or from increased formation in spite of hemolysis.

Hemoglobin. In pernicious anemia, hemoglobin remains relatively high. The standards of estimation vary. But the general opinion is that the red cell count is lower relatively than hemoglobin and so color index is one or above one in pernicious anemia; the blood looks red, but watery.

Red Cells. Every red blood cell, physiologists tell us, sooner or later undergoes disintegration. The real and ultimate fate of red blood cells is not known, but it is supposed from suggestive evidence that the spleen and liver serve as sites of final disintegration whether the intermediate stage of destruction is by phagocytic action or fragmentation.

The formation of the red cells is in the red bone marrow and oxygen appears to be the needed stimulus to red cell formation. In pernicious anemia the red cells show any of the abnormalities. Macrocytosis (giant-cell formation) is the chief characteristic of the blood in pernicious anemia. Microcytes also are commonly observed. Abnormalities of the red cells embrace all forms. The evidence of many microcytes and fragmented cells points to a recent increase in cell destruction. Poikilocytosis (varied cell formations) is marked. In good remissions the cells may be difficult of interpretation; in relapses the blood picture is more easily recognized. Polychromatophilia (many + color + to love, or stainable with various stains) and stippling frequently occur. Nucleated red cells are usual in pernicious anemia. Megaloblasts (large + germ) are very usual and were formerly taken as pathognomonic. The blasts, disclosing an effort on the part of the bone marrow to regenerate, appear to come out in crises as though the marrow was making final efforts to regenerate the blood.

The white cells are diminished (leukopenia) denoting marrow deficiency. The blood platelets show the same state of exhaustion by a diminution in number. Coagulating time of the blood in pernicious anemia is not markedly abnormal.

Finally, the summary of Wilson and Evans in the study of the clinical histories of 111 cases of pernicious anemia in the Johns Hopkins Hospital from 1918 to 1922 may be of interest.

1. Pernicious anemia is about equally common in men and women, or possibly, slightly more common in men.

2. It is a disease of adult life. It is never seen in children, is uncommon in old age, and occurs most frequently between the ages of 40 and 60 years.

3. It is very uncommon in negroes.

4. The anemia, once established, practically never completely regenerates.

5. Anisocytosis and poikilocytosis are constant findings. Basophilia is rather uncommon, although it does occur.

6. Although a leucocytosis may occur in the presence of an infection, a leucopenia is the characteristic finding.

7. An eosinophilia as high as 17 per cent may be found, but an actual increase in eosinophile cells are the rare exception. The same applies to the large mononuclear and transition cells.

8. Myelocytes, as high as 10 per cent, may be found in an occasional case.

9. Free hydrochloric acid in the gastric contents of these patients is so rare that, when present, it should put the diagnosis under suspicion.

10. The spleen is palpable in only about 20 per cent of pernicious anemia patients. It may, however, extend 5 to 6 cm. below the costal margin.

11. The liver is palpable in about 33 per cent of pernicious anemia patients. The edge may be palpated 5 to 6 cm. below the costal margin.

12. All patients, whatever other discomforts they may have, suffer from one or more of the following symptoms: weakness, disturbances of digestion, and nervous disorders of the extremities.

REFERENCES.

1. Oxford Medicine, Vol. 2, page 611.
2. Bulletin of Johns Hopkins Hospital, Vol. 35, No. 396, page 38. An Analysis of Clinical Histories of Patients with Pernicious Anemia in the Johns Hopkins Hospital from 1918 to 1922, inclusive. By Charles R. Wilson and Frank A. Evans.
3. Physiology and Biochemistry in Modern Medicine. Page 904. MacLeod.

News Notes

Virginia Society for Crippled Children.

By the formation recently of the Virginia Society for Crippled Children, a definite progressive step was taken consistent with the most advanced ideas in the care and education of ALL crippled children, not just the limited number who are fortunate enough to find their way into existing hospitals and schools. At the present time a project of international scope is being developed, involving eleven of the United States and two Provinces of Canada; this Society has for its fundamental principle "the assuming of the responsibility for

the care, cure, and education" of the 300,000 cripples in our land. All the above state units are working together toward the same end through their combined effort under the name of The International Society for Crippled Children.

The Virginia Society for Crippled Children is one of the component parts of the parent organization and will help to aid in and control this larger and broader activity, as well as develop the work in its own state. This Society is not in the interest of any one hospital, city, or individual, but is to work for the betterment and enlargement of present facilities and the development of newer units where necessary.

In the State of Virginia there are estimated to be about 7,500 crippled children, these figures being very conservatively based on the experience of other states, especially Kentucky and Tennessee. Kentucky was supposed to have had 5,000 crippled children, whereas more accurate figures recently, following surveys, show it has about 12,000. Hence, the estimate for Virginia will probably be well below the actual number present. The number of these children treated during the past five years, according to recent estimates, is not over 2,000, so that with the constant developing of crippling conditions, the immensity of the problem can be appreciated. There are at least four or five thousand children at present who need treatment badly, but who cannot receive same under present facilities.

The procedure best suited to the particular needs of this problem is summed up in the phrase "take the facilities to the child in so far as is possible." That is, develop the necessary facilities of care, cure, and education as near to the homes of these children as can be, particularly as regards the education. Only a few centers are necessary to carry out the acute hospital, or operative care, due to the fact that only twenty-five per cent need hospital treatment, but many so-called convalescent homes are needed in which are held special classes for physical as well as mental education, vocational and special training, etc.; in these classes the children can receive the individual attention so necessary if any progress is to be made.

Before any steps can be taken toward the development of this work, the accurate number and location of all the cripples should be known, and a determination made as to their physical and mental status; in other words, surveys of the various cities and counties must

be made and numbers of clinics held, and general interest must be aroused. The Virginia Society for Crippled Children will sponsor and stimulate proper surveys of any and all communities by enlisting the interest and help of any and all groups or clubs desirous of furthering this great work. It is the earnest desire of those interested in this Society and its work to get the active co-operation of all existing organizations, especially the medical societies upon whose members rests the fundamental foundation of all work of this character. The physician knows, or ought to know, intimately the parents of these children, as well as the children themselves, and he can therefore advise and instruct them as to the best course to pursue; he can see that the children are cared for in the early and developmental stages, so that the attention of this Society can be directed toward their relief or at least toward the finding of facilities for their care and education.

This Society wishes to bring together into one concerted effort all clubs and agencies desiring to help and work toward the goal of finding and alleviating the distresses of nature as expressed in these children. It should be a community affair, not limited to any one group or club, although a beginning must be made by some one group.

The next meeting of The Virginia Society for Crippled Children will be in March, when permanent officers will be elected and a constructive policy formulated. All clubs or organizations desiring to enlist in this work can get full information from the Secretary-Treasurer of the Society. The temporary officers are Dr. L. T. Royster, University, president; Mr. L. B. Hindman, Roanoke Y. M. C. A., vice-president; Professor Chas. G. Maphis, University of Virginia, secretary-treasurer.

"Strike" Malpractice Damage Suits

Are among the latest frands to be perpetrated against physicians. Several of these have been attempted against New Jersey physicians. In an effort to suppress them, the Medical Society of New Jersey has appointed a Defense Council to look after the interests of its members. This Committee has petitioned the press of the State to co-operate with them by refusing to publish accounts of suits against physicians until they are terminated in court. In their request they state that "in no instance has the Medical Society protected, or will it

protect, any physician who has been guilty of negligence, dishonesty or incompetence, much less of violation of law."

During the past few years, suits have been brought against some New Jersey physicians by individuals, with the assistance of unscrupulous lawyers who place pecuniary advantage above ethical consideration. They seem to believe that, to avoid the publicity of such an action, even where there is not a remote chance of obtaining a verdict, a physician will settle out of court. It is simply a form of blackmail. The plan of the Defense Council is to hear the physician's side of the case and, if they regard him guiltless, to order the case defended. In the past two years not a dollar has been collected by law out of suits aggregating \$400,000. In every case defended by the State Society, the verdict has been in favor of the physician.

A "Delano Nurse" in Buchanan County, Va.

Miss Mary Emily Thornhill is the first nurse to be assigned to Virginia under the terms of the will of the late Jane A. Delano, director of Red Cross Nursing Service during the World War. Miss Delano left a fund with which to pay special nurses who are assigned to territories where the need for educating the population in primary public health rules is great. Miss Thornhill has been detailed to Buchanan County which, with a population of 15,500, is said to have the highest birth as well as the highest death rate of any county in Virginia. There are only two physicians in Buchanan County in general practice and two physicians associated with lumber companies—four in all—and no public health nurses. This is an isolated mountainous section in which travel is done by horseback.

Miss Thornhill, a graduate of the Children's Hospital, in Washington, is exceptionally well fitted for her new work. She saw active service during the World War and later took a special course in Public Health Nursing in Richmond. Since then, she has been interested in working for crippled children in Alexandria and vicinity. She reports that the people in Buchanan County are already meeting her more than half way in their eagerness to learn how to improve their living conditions.

Miss Thornhill is the fourth "Delano Nurse" to be appointed by the Red Cross in the United States, the others being located in Alaska, on the coast of Maine, and at Highlands, N. C.

The Tri-State Medical Association of the Carolinas and Virginia

Held its annual meeting in Greenville, S. C., February 20-21, under the presidency of Dr. Dr. Chas. O'H. Laughinghouse, of Greenville, N. C. The meeting was well attended, the papers interesting, and the Greenville doctors contributed in every way to the entertainment and pleasure of those in attendance.

Richmond, Va., was selected as the meeting place for the February, 1925, meeting and headquarters will be at Jefferson Hotel. Officers elected for the ensuing year are: President, Dr. F. H. McLeod, Florence, S. C.; vice-presidents, Drs. Garnett Nelson, Richmond, C. S. Lawrence, Winston-Salem, N. C., and E. W. Carpenter, Greenville, S. C.; secretary-treasurer, Dr. James K. Hall (re-elected), Richmond. New members of the Executive Council are Drs. W. B. Porter, Roanoke, Va., E. S. Boice, Rocky Mount, N. C., and Francis B. Johnson, Charleston, S. C. Those holding over are Drs. F. M. Hodges, Richmond, D. A. Stanton, High Point, N. C., W. R. Wallace, Chester, S. C., F. C. Rinker, Norfolk, J. W. Long, Greensboro, N. C., and George H. Bunch, Columbia, S. C.

The Convalescent Home for Crippled Children

Was formally opened in Richmond on February 24. This home has fourteen large rooms and a new sun parlor and will comfortably accommodate twenty-five convalescent crippled children and a corps of nurses and attendants. The children are taken from Dooley Hospital in this city, and help to relieve the congestion there. No surgeon or physician receives remuneration for his services and expenses in the care of these little patients, and all the money is contributed personally or by local organizations. Dr. W. T. Graham is chief orthopedic surgeon to the home.

It is interesting to note that, since Dr. Graham and the visiting nurses began their work among Virginia's crippled children in July, 1918, 1,231 maimed children have been operated upon, and 1,149 of these have practically been cured. In connection with this work, orthopedic clinics are now held in several Virginia cities.

Conference of Maritime Quarantine Authorities of the West Coast of South America.

Dr. Belasario Porras, the President of the Republic of Panama, called a conference to

meet in Panama, R. P., on February 25, 26, 27, 28 and 29 for the purpose of considering the international standardization of maritime quarantine on the west coast of South America and the prevention of international spread of communicable disease in that litoral.

The conference held formal discussions each morning at which were taken up questions bearing upon maritime quarantine regulations; the methods, periodicity and certification of ship fumigation; uniform quarantine declarations and uniform bills of health. Afternoons were devoted to practical demonstrations of public health and hospital methods. Clinics were held at various hospitals. Interesting demonstrations were given.

The Medical Association of the Isthmian Canal Zone held a special meeting at the Santo Tomas Hospital for the conference. A visit was made to the site of the Gorgas Memorial Institute and this constituted one of the outstanding features of this international meeting. There were many social functions for the delegates.

The secretary-general of the conference was Surgeon William Colby Rucker, U.S.P.H.S., Chief Quarantine Officer of the Panama Canal. Physicians, surgeons and public health workers visiting the Isthmus of Panama at the time of the conference attended.

The Medical Work of the Near East Relief.

This pamphlet, edited by Geo. L. Richards, M. D., gives in brief outline something of the work performed by the Medical Division of the Near East Relief during its first year in Turkey. It is a record of obstacles overcome and results attained and, for the most part, is made up of reports furnished the editor by the physicians themselves. It gives much interesting reading.

Copies will be sent upon request to "Near East Relief," 151 Fifth Avenue, New York, N. Y.

Hygeia,

The magazine of individual and community health, deals with subjects pertaining to personal health, mother craft, diet and foods, community health, medical news and discoveries, school health, and has a special children's department and one of questions and answers. Is any magazine better suited to be put into the hands of your patients desiring knowledge of health? Its gives impressionable people as well as those seeking knowledge the best views

of these subjects from the most competent authorities in the country. The price is only \$3 a year.

A "clip sheet," giving abstracts of articles from *Hygeia*, is published by the American Medical Association each month. Upon request, this "clip sheet" could be sent your local newspapers for the purpose of reprinting items.

Married.

Dr. Herbert Claiborne Jones and Miss Catherine Scott Smith, both of Petersburg, Va., February 23.

Dr. Arthur Hooks and Miss Edith Kelly, both of Bristol, Va., March 8. Dr. Hooks graduated from the Medical College of Virginia in 1912 and served in the medical corps during the World War. He has for three years been years been associated with Dr. T. F. Staley, of Bristol, in treatment of diseases of the eye, ear, nose and throat.

Dr. S. A. Conduff,

Of Laurel Fork, Va., is in New York City, taking a special course in diseases of the eye, ear, nose and throat.

Dr. G. W. Parson,

Of the class of '22, Medical College of Virginia, who has been located at Swords Creek, Va., is now associated with his brother, Dr. A. D. Parson, at Raven, Va.

Dr. W. E. Dickerson,

Who located in Danville, Va., upon completing his service at Retreat for the Sick, Richmond, last year, has moved to Bramwell, W. Va.

Dr. T. C. Harris,

Recently of Martinsville, Va., has moved to Radford, Va.

Dr. L. M. Abbott,

Who has been located for some years at Lignite, Va., has moved to Flinn, Alleghany County, Va.

Dr. J. Edwin Wood, Jr.,

Who graduated from the University of Virginia in 1921, after service at the Massachusetts General Hospital, and later studying in Boston, returned to Virginia this past fall and became connected with the medical staff of the University of Virginia.

Dr. L. L. Williams, Jr.,

Who has been connected with the malaria control work in Virginia for the past two years, under the auspices of the U. S. Public Health

Service, has been detailed by the service to a similar work in South Carolina. He is at present in Columbia, S. C., and will probably be absent from Virginia until May.

Dr. Watson S. Rankin,

State Health Officer of North Carolina, now on leave of absence from that State, that he might serve for a year as field director with the American Public Health Association, was in Richmond the latter part of February, studying the work of the local Bureau of Health.

To Endow Phipps Psychiatric Clinic.

It has just been announced that Mr. and Mrs. Henry Phipps were the anonymous donors, last year, of \$1,000,000 to Johns Hopkins University. The gift was conditional upon the raising of an additional \$1,000,000. This has now been pledged and the permanent endowment of the Phipps Psychiatric Clinic is a certainty.

Pittsylvania Board of Public Welfare.

Dr. R. W. Bennett, Toshes, and Dr. L. E. Fuller, Witt, are among those who have been appointed members of the Pittsylvania County (Va.) Board of Public Welfare.

Dr. William Evans,

Norfolk, Va., was elected a member of the board of managers of the recently organized chapter of Sons of the American Revolution, in Norfolk, Va.

Dr. and Mrs. E. C. Fisher

And son returned to their home in Richmond, about the middle of February, after spending some time in Tampa and St. Petersburg, Fla.

Dr. J. C. Bodow

Is one of the charter members of the Rotary Club being organized in Hopewell, Va.

Dr. E. A. Terrell,

Of Fredericks Hall, Va., is spending a two months' vacation in Florida.

With Chamber of Commerce Committees.

Drs. Charles A. Blanton, Charles R. Robins, J. Shelton Horsley, and W. H. Parker, all of Richmond, have been named members of standing committees of the local Chamber of Commerce.

Medals Awarded for Radiological Work.

The Radiological Society of North America, at its meeting recently held at Rochester, Minn., awarded gold medals to Dr. Emil G. Beck and Mr. Clyde Snook, for their achievements in the field of radiology.

The Virginia State Dental Association

Will hold its annual meeting in Norfolk, Va., April 28-30. At this meeting there will

be presented several papers which will treat of dentistry in its relation to general medicine. Dr. C. B. Gifford, Norfolk, is president, and Dr. Harry Bear, Richmond, secretary.

Dr. Chichester goes to Arlington County.

Dr. P. M. Chichester, formerly medical inspector for the Richmond Bureau of Health, and for the past year director of the Loudoun County Health Unit, has been appointed to a similar position in Arlington County, succeeding Dr. James W. Cox, resigned. Dr. Cox will continue in health work but has not yet announced his plans.

It is understood that Loudoun County has not made the necessary appropriation for the continuance of the health work in that county under auspices of the State Board of Health.

Dr. A. L. Stratford, II.,

Who graduated from Medical College of Virginia in 1921, has returned to his home in Richmond and has opened offices at 315 East Main Street. He will be engaged in the practice of obstetrics. Since graduation, Dr. Stratford has had service with Bellevue and Nursery and Child's Hospitals in New York City.

Dr. J. R. Gorman,

Lynchburg, Va., who was recently operated on for appendicitis, is at his work again.

News of Medical College of Virginia.

Plans are being made for reunions of the classes of 1868, 1899 and 1914 during commencement exercises of the Medical College of Virginia in June.

Dr. George R. Shapiro, Brooklyn, N. Y., of the class of '17, is working on a plan to organize a chapter of Medical College of Virginia alumni in Brooklyn.

Dr. Teusler Honored.

Dr. Rudolph Teusler, formerly of Richmond, was decorated with the Order of the Sacred Treasure, fifth class, at ceremonies held in Tokyo, last month, incident, to the celebration of Japanese Empire Day. Dr. Teusler is a director of St. Luke's International Hospital at Tokyo, a member of the American Embassy staff, and the American Episcopal Mission.

Masonic Honors.

At the meeting of the Grand Lodge of Virginia Masons in Richmond, last month, the following are among those appointed district deputy grand masters: Dr. R. R. Nevitte, Temperanceville; Dr. T. G. Bradshaw, Windsor; and Dr. J. L. Early, Saltville.

Dr. Cumming as Surgeon General, U. S. P. H. S.

President Coolidge has forwarded to the Senate a recommendation for the re-appointment of Dr. Hugh S. Cumming as surgeon general of the U. S. Public Health Service. Dr. Cumming is a native Virginian and studied medicine in this State. He was first appointed to this position during President Wilson's administration.

Dr. J. Shelton Horsley,

Richmond, by invitation, read a paper on February 20th, in Newark, before the Academy of Medicine of Northern New Jersey. His subject was "Surgery of Intestine, with Special Reference to the Underlying Physiologic Principles."

We were interested in learning from Dr. Horsley, that this association, though rather small of membership, owns its own home and has a collection of rare old medical books which it would be difficult to duplicate.

Memorial Health Building.

Watertown, N. Y., has erected a new health building as a memorial to the men of that city who served in the World War. In addition to the office of the superintendent and offices for the local Red Cross chapter, quarters are provided for tuberculosis, child welfare, dental and other clinics.

Dr. Leathers Member of National Board of Medical Examiners.

Dr. Waller S. Leathers, dean and professor of Histology at University of Mississippi, School of Medicine, has been appointed a member of the National Board of Medical Examiners. Dr. Leathers has many friends in Virginia, having graduated from the University of Virginia in 1894.

Dr. Joseph W. Peabody

Has been appointed assistant professor of clinical medicine at Georgetown University, Washington, D. C. He will continue in charge of the Tuberculosis Hospital of the District as also medical director of the tuberculosis dispensary of the Board of Health.

Dr. H. R. Fairfax,

Who has been located in Bristol, Va., for several years, is taking a post-graduate course in New Orleans, after which he expects to locate at Brookhaven, Miss.

Dr. Bernhard S. Steinberg,

Who served for a year as an interne at Me-

morial Hospital, Richmond, after graduation from Boston University School of Medicine, in 1922, has now located in Boston for the practice of medicine.

The American Proctologic Society,

At its last meeting, decided to hold the first part of its meeting in New York City, where its scientific and business sessions will be held and, upon invitation of proctologists in England, to hold an adjourned meeting in London. Dates for the New York meeting are June 23-25, and the members will probably sail about June 28. Physicians in good standing are invited to join the Society on this trip. Information may be obtained from Dr. Ralph W. Jackson, secretary, 245 Cherry Street, Fall River, Mass.

Dr. and Mrs. R. L. Hudnall,

Who have been in Chicago, since their marriage last November, have returned to their home at Beverlyville, Va.

Noted Endocrinologist Addresses Richmond Doctors.

Dr. Arthur Biedl, professor of endocrinology at the University of Prague, addressed the Richmond Academy of Medicine, at its meeting on February 26, his subject being "Cerebral Adiposity." Dr. Biedl is in this country upon invitation of the Medical School of the University of Chicago, to deliver the annual Dodson Memorial Lectures. While in this country, he will make addresses at several medical schools. While in Richmond, he also spoke to the students at the Medical College of Virginia.

Dr. George Green,

A graduate of the Medical College of Virginia and now a medical missionary in South Africa, gave an illustrated talk at one of the Richmond churches last month, at which he told of the work being done in his mission field. After graduating in Richmond in 1905, Dr. Green served as one of the internes at St. Vincent's Hospital, Norfolk.

Dr. Jury B. Loving,

Who located in Danville, Va., last summer, upon completion of his internship at St. Luke's Hospital, Richmond, has moved to Williams-ville, Bath County, Va.

Dr. E. L. Marshall,

Big Island, Va., has been named a vice-chairman of the Bedford County (Va.) Board of

Agriculture. The object of this organization is to do for the county what boards of trade and chambers of commerce do for towns and cities.

Dr. Beverley R. Tucker

Has been elected president of Westmoreland Club, Richmond, for the year beginning March 1, 1924.

Roanoke Hospital Association Receives Gift.

It is announced that a large gift has been made the Roanoke Hospital Association of Roanoke, Va., by a citizen of that city. This will make possible the immediate remodeling of the old unit of the hospital. It is the purpose of the Association to enlarge the hospital to a capacity of about 116 beds.

Dr. H. S. Belt

Recently returned to his home in South Boston, Va., after a visit to his brother in New York.

Dr. Robert L. Kern,

Richmond, was elected venerable master of the Libertas Lodge of Perfection, No. 5, Ancient and Accepted Scottish Rite of Freemasonry, at its annual meeting held in this city, the latter part of February.

Dr. S. W. Maphis,

Warrenton, Va., after spending sometime in North Carolina recuperating after illness, has gone to Hot Springs, Va., for a visit.

Dr. C. H. Saunders

And several friends of Chase City, Va., have returned home after spending sometime in Florida.

"Value of Gelatine in Infant Feeding."

Physicians who have not received the first report of the research work of the above pamphlet, may have a complimentary copy by addressing Charles B. Knox Gelatine Co., Inc., Johnstown, N. Y. They also issue pamphlets with attractive and palatable ways of preparing gelatine dishes for the sick and well.

Index Number.

This issue is index number of the VIRGINIA MEDICAL MONTHLY. We expect to maintain our high standards in the next volume and count on the co-operation of our members in this work. The scientific and business parts are interdependent the one on the other and it is our aim to keep them both on a high plane.

Dr. E. A. Hatton,

Who is in charge of medical inspection in the Portsmouth, Va., schools, was taken sud-

denly ill on the first of this month and is in Parrish Memorial Hospital, that city.

Dr. E. R. Miller

Has returned to his home in Harrisonburg, Va., after a visit to his son at the University of Richmond.

Dr. S. C. Draper,

Who has been practicing in Pulaski, Va., has gone to Norfolk, Va., where he will be connected with the Pension and Relief Department of the Norfolk and Western Railway.

Public Health Summer Schools.

In response to a great demand for summer school work in public health, the U. S. Public Health Service has arranged short term summer courses to be given at Columbia University, New York City, University of Michigan, Ann Arbor, University of Iowa, Iowa City, and University of California, Berkeley. The courses will extend over six to eight weeks and cover a wide range of subjects. Tuition fees will be moderate.

If interested, further information may be obtained from Surgeon General of the U. S. Public Health Service, 16 Seventh Street, Southwest, Washington, D. C.

Wise County Medical Society.

The regular meeting of this Society held at Norton, Va., February 27, was well attended. Dr. Charles Stevens, of Baltimore, addressed the Society on "Antitoxins and Vaccines." Dr. F. C. Handy, of Toms Creek, was elected a member. Dr. F. S. Givens, of Wise, was elected president, and Dr. C. B. Bowyer, Stonega, was re-elected secretary-treasurer. Following the meeting, a banquet was served members, friends and invited guests at the Norton Hotel.

Dr. B. I. Bell,

Williamsburg, Va., has returned to his home in that place, after spending sometime in New York City, specializing in X-ray and nose and throat work.

Dr. Charles R. Irving,

Who has been located at Howardsville, Va., since returning from the World War, has moved to Martinsville, Va., where he will be a member of the staff of the Lucy Lester General Hospital.

Chiropractors Try to Secure Legislation.

During the meeting of our State Legislature, just adjourned, two bills were presented

by different sets of chiropractors. One called for the creation of a chiropractic board; the other requested that a chiropractic be placed on the Virginia State Board of Medical Examiners. Neither of these bills exacted the educational requirements made by our State Board. Both were killed in different committees and, as we go to press, there seems no likelihood that the chiropractors will get through any legislation this year.

The Medical Society of The District of Columbia,

At its annual meeting, held recently, elected Dr. John D. Thomas president, Dr. Coursen B. Conklin secretary, and Dr. William J. Mallory legislative chairman.

National Health Series.

In order to make available to the general public at moderate prices authoritative books on all phases of human life, the National Health Council has arranged with the Funk and Wagnalls Company for the publication of The National Health Series. It will contain twenty books of about 18,000 words each, written by leading health authorities of the country. These books, bound in flexible fabrikoid, sell for 30 cents each, or \$6.00 for the series of twenty. They will be issued in sets of five each.

The Tennessee State Medical Association

Will hold its annual meeting in Knoxville, April 11-13, 1924. The president is Dr. H. L. Fancher, Chattanooga, and secretary Dr. Joseph F. Gallagher, Nashville.

The Medical Society of The State of North Carolina

Will hold its annual meeting in Raleigh, April 15-17, 1924, under the presidency of Dr. J. V. McGougan, of Fayetteville. Dr. L. B. McBrayer, of Sanatorium, is secretary.

The American College of Physicians,

At its recent meeting in Chicago, conferred fellowships upon 178 candidates. Dr. Harlow Brooks, of New York, was elected president for the coming year, and Dr. Frank Smithies, of Chicago, was re-elected secretary general.

The South Carolina Medical Association

Is to hold its annual meeting in Orangeburg, April 15-17. Dr. Leland O. Mauldin, Greenville, is president, and Dr. E. A. Hines, Seneca, secretary.

Dr. Crile Resigns.

It is announced that Dr. George W. Crile has tendered his resignation, effective July 1,

as professor of surgery at Western Reserve University Medical School, Cleveland, Ohio, and also as house surgeon of Lakeside Hospital. He plans to devote his time to research work and private practice.

Dr. Elliott C. Cutler, of Peter Bent Brigham Hospital, Boston, will succeed Dr. Crile.

"Bread for The New Family."

This pamphlet, issued by the Bureau of Child Welfare, of the Virginia State Board of Health, co-operating with the Children's Bureau, Department of Labor, U. S. A., is the third in the New Family Series. As its name indicates, it treats of bread and the kind of flour for making it to be used by the "New Family." Teachers, health workers and others interested may secure copies upon application to the State Registrar of Vital Statistics, Richmond, Va.

Dr. Thomas C. Johnson,

Who has been charge of the Thompson Hospital, at Lumberton, N. C., since the death of Dr. Neill A. Thompson in 1922, has now leased the hospital and will continue to operate it. Dr. Johnson has many friends in Virginia, having graduated from the University College of Medicine, Richmond, in 1903.

Income Tax Returns

Should be filed with the Collector of Internal Revenue for your district on or before March 15, 1924. A fine is imposed for non-compliance with this law. If personal illness is liable to delay this return, an extension of time should be secured from the Collector of your district.

Sterilization Bill Presented Legislature.

A Senate bill providing for the sterilization of inmates of State institutions for the insane, feeble-minded and epileptic, was reported unanimously by the House Committee on Asylums and Prisons, the latter part of February. Dr. A. S. Priddy, of the State Epileptic Colony, Lynchburg, and Dr. J. S. DeJarnette, of the Western State Hospital, Staunton, appeared in support of the bill, as did also prominent laymen interested in this work.

The Augusta County (Va.) Medical Association

Held its regular quarterly meeting in Staunton, February 6, Dr. A. F. Robertson, Jr., Staunton, presiding. Several papers were read, including an interesting symposium on Cancer. Dr. H. G. Middlekauff, Weyers Cave, Va., is secretary of this Association.

Dr. Thomas D. Jones,

Of Petersburg, Va., who graduated from the University of Virginia, Department of Medicine, last June, is now at the Houston Clinic, Houston, Texas.

Dr. Harry L. Claud,

Recently of Newport News, Va., has moved to Washington, D. C., where he will be located at 1744 N Street, Northwest.

The American Congress on Internal Medicine,

At its annual meeting in St. Louis, last month, selected Washington, D. C., as its 1925 meeting place, and elected Dr. William Gerry Morgan, of Washington, president. Dr. Frank Smithies, of Chicago, was re-elected secretary general.

"Reciprocity Between the Health Officials and the Medical Profession."

Under this caption, Dr. E. C. Levy, director of Public Welfare of Richmond, gave his presidential address before the last meeting of the American Public Health Association. It outlines the advantages to both the American Public Health Association and the American Hospital Association in bringing about a closer relationship between the public health administrator and the hospital and dispensary. He brings out clearly in his paper how health authorities uphold the rights of physicians and how they can be of service, the one to the other, and not antagonistic. It is a paper which should enjoy a wide publicity. A limited number of copies may be obtained from the American Public Health Association, 370 Seventh Avenue, New York, N. Y.

Important Decision Helps American Chemistry.

The decision of the U. S. Court, District of Delaware, in favor of The Chemical Foundation, Inc., is of far-reaching importance to the medical profession, and to the manufacturers of medicinal chemicals. Prior to the World War, the medical profession was practically dependent upon foreign sources of supply for many important drugs. Patents were held in this country by foreign owners—not that the drugs might be manufactured here, but that American firms might not make them.

In order to establish and foster the chemical industry in this country, the patents were sold by the United States Government to The

Chemical Foundation, Inc., so that no exclusive licenses might be issued to American concerns. This plan of devoting these patents to the public use has stood the test of actual trial, and has proven a success. Many of the important medicinal chemicals previously unobtainable from American sources, are now manufactured in this county, and the medical profession now has the assurance that, unless there should be some later and unexpected reversal of this decision, they may never again be dependent upon foreign monopoly in drug supplies.

To further foster the use of American-made medicinals, the Federal Trade Commission, the National Research Council, the Council on Pharmacy and Chemistry of the American Medical Association, and other agencies have suggested and provided new and distinctive names for American synthetics which are rapidly replacing those formerly made only abroad, and it is suggested that physicians might be performing a patriotic duty to use, specify, and refer to these drugs by their American names. Among the products so designated are arsphenamine, neoarsphenamine, barbital sodium, cinchophen, neocinchophen and procaine. The Chemical Foundation Inc., also licensed certain manufacturers to make, in this county, acriflavine and neutral acriflavine.

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Obituary

Dr. William Fewell Merchant,

Manassas, Va., died at his home in that place, February 21, at the age of 56 years. He graduated from the former University College of Medicine, Richmond, in 1897, and was located in South Richmond for some years, at which time he was a local surgeon for the Southern Railway. Later he moved to Manassas and, at the time of his death, was a surgeon for both the Southern and Chesapeake and Ohio Railways. He was also a member of the Prince William County Board of Health and of the Medical Society of Virginia. During the World War, he was stationed at Camp Lee and retired with the rank of captain in the medical corps. His wife and a son survive him.

Dr. Julian Thomas Doles,

A practicing physician of Ivor, Va., died in Portsmouth, February 28, at the age of 59 years. He had been in poor health and was under hospital treatment. Dr. Doles studied medicine at the College of Physicians and Surgeons, Baltimore, from which he graduated in 1887. Dr. H. M. Doles, of Norfolk, is a son of the deceased.

Dr. Walter S. Roy,

Of Front Royal, Va., died at the home of his daughter in Newport News, Va., the middle of February, and was buried in Front Royal. He was 82 years old. After serving throughout the Civil War, he took up the study of medicine at the Medical College of Virginia and graduated in 1868. Soon thereafter, he located in Front Royal, where he became one of the best known and most beloved physicians of that section of the State. He was at one time a member of the Medical Society of Virginia.

Dr. Theodore Frederick Reusch

Died in Bedford County, Va., after an illness of four years, which dated back to his service in the World War, through which he served as captain in the medical corps. He was 40 years of age and graduated from the Homeopathic Medical College of Missouri, St. Louis, in 1908. His wife survives him.

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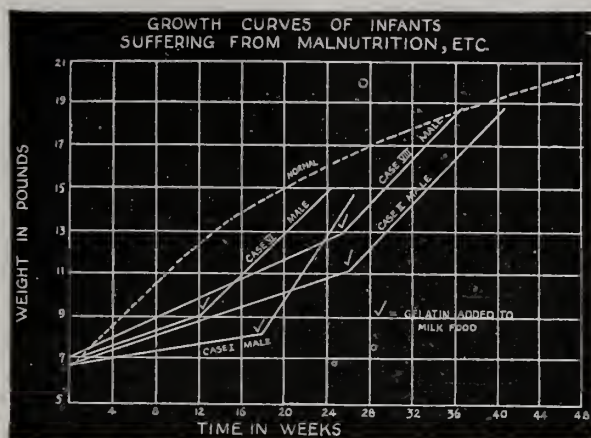
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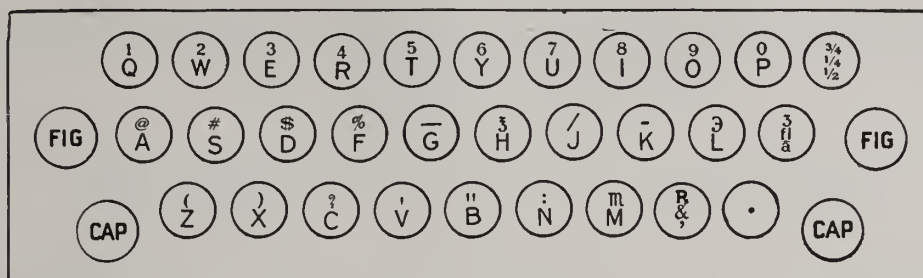
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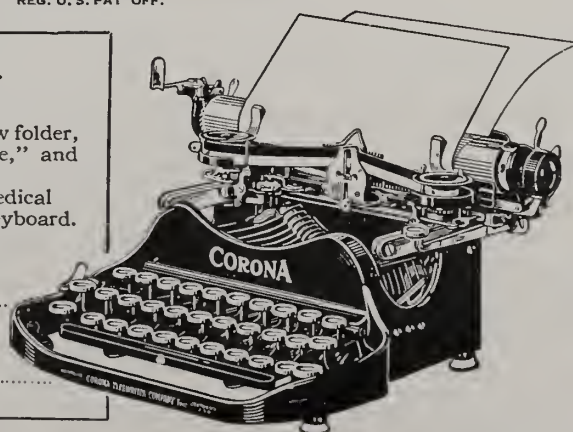
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12

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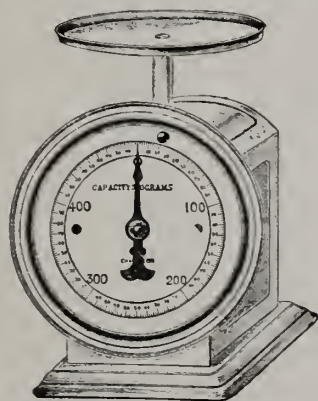
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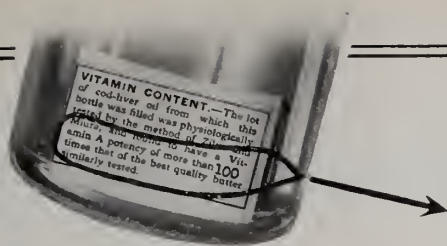
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Fairfax Co. Med. Soc.....	C. A. Ransom, E. Falls Church..	W. P. Caton, Fairfax.....	
Floyd Co. Med. Soc.....	M. L. Dalton, Floyd.....	R. T. Akers, Alum Ridge.....	
Frederick-Clarke Co. Med. Soc.	R. C. Randolph, Boyce.....		
Fredericksburg Med. Assn.....	R. Dew, Woodford.....	J. N. Barney, Fredericksburg..	
Greensville Co. Med. Soc.....	G. B. Wood, Emporia.....	M. H. Tredway, Emporia.....	
Isle of Wight Co. Med. Soc.....	Rea Parker, Smithfield.....	E. M. Easley, Rushmere.....	
Jas. City Co. Med. Soc.....	J. M. Henderson, Williamsburg..	D. J. King, Williamsburg.....	
Lee Co. Med. Soc.....	C. C. Pearce, Pennington Gap..	P. D. Pence, St. Charles.....	
Loudoun Co. Med. Soc.....	G. F. Simpson, Hamilton.....	Saml. L. Steer, Waterford.....	1st Wednesdays, Monthly.
Louisa Co. Med. Soc.....	F. J. Kellam Mineral.....	H. S. Daniel, Louisa.....	
Lunenburg Co. Med. Soc.....	Edwin Mann, Kenbridge.....	Robt. Whitehead, Meherrin....	
Lynchburg & Campbell Co. Med. Soc.	F. O. Plunkett, Lynchburg....	R. D. Caldwell, Lynchburg....	
Mathews Co. Med. Soc.....	C. M. Raines, Bohannon.....	C. C. White, Mathews.....	
Mecklenburg Co. Med. Soc....	W. M. Wilkinson, La Crosse....	H. M. Snead, South Hill.....	
Med. Soc. Va., Md. & D. C..	W. J. Mallory, Washington, D. C.	J. D. Rogers, Washington.....	May and November.
Med. Society of Va.	W. W. Chaffin, Pulaski	Agnes V. Edwards, Richmond..	Staunton, October 14-17, 1924.
Nansemond Co. Med. Soc.....	H. H. Hunter, Whaleyville.....	C. F. Griffin, Suffolk.....	
Nelson Co. Med. & Surg. Soc....	H. G. Dickie, Massies Mill	J. F. Thaxton, Tye River.....	
Norfolk Co. Med. Soc.....	C. W. Doughtie, Norfolk	Lockburn Scott, Norfolk.....	Norfolk, Weekly.
Northampton Co. Med. Soc.....	H. Trower, Eastville	J. M. Lynch, Cape Charles....	
Northern Neck Med. Soc.....	M. C. Oldham, Lancaster	R. E. Booker, Lottsburg.....	
Nottoway Co. Med. Soc.	W. T. Warriner, Crewe.....	J. R. Adams, Blackstone.....	
Patrick-Henry Med. Society....	J. A. Shackelford, Martinsville..	G. B. Dudley, Jr., Martinsville..	Bi-monthly.
Petersburg Med Faculty	D. Willcox, Petersburg	J. M. Harwood, Petersburg.....	3rd Thursdays.
Piedmont Medical Society	E. D. Davis, Stanardsville....	L. Holladay, Orange	
Pr. Edward Co. Med. Soc.....	J. Weldon Smith, Farmville....	Susan W. Field, Farmville....	
Pr. Geo. Co. Med. Soc.....			
Pr. Wm. Co. Med. Soc.....	T. G. Brown, Gainesville.....	W. F. Merchant, Manassas....	
Rchd. Acad. Med. & Surg.....	J. Allison Hodges, Richmond....	M. W. Peyser, Richmond.....	2nd and 4th Tuesdays.
Roanoke Academy of Medicine..	H. B. Stone, Roanoke	M. A. Johnson, Roanoke	1st and 3rd Mondays.
Rockbridge Co. Med. Soc.....	Robt. Glasgow, Lexington.....	B. W. Switzer, Lexington.....	
Rockingham Co. Med. Soc.....	J. E. Lincoln, Lacey Springs....	A. C. Byers, Harrisonburg.....	
Seaboard Med. Assn.....	Wm. E. Warren, Williamston..	C. P. Jones, Newport News, Va.	Rocky Mount, N. C., Dec. 1924.
Shenandoah Co. Med. Soc.....	W. F. Driver, New Market.....	F. C. Downey, Edinburg.....	
Southampton Co. Med. Soc.....	S. J. Railey, Handsom	R. L. Raiford, Sedley	
So. Piedmont Med. Soc.....	P. W. Miles, Danville.....	G. A. Stover, South Boston....	April and November.
Southside Va. Med. Assn.....	Geo. H. Reese, Petersburg	R. L. Raiford, Sedley.....	March, June, Sept., Dec.
Southwest Va. Med. Soc.....	S. S. Gale, Roanoke	Elbyrne Gill, Roanoke.....	May and September.
Surry Co. Med. Soc.....	T. W. Seward, Surry.....	C. W. Astrop, Surry.....	
Sussex Co. Med. Soc.....	W. M. Raines, Wakefield.....	C. P. Nehlett, Waverly.....	
Tazewell Co. Med. Soc.....	H. B. Frazier, Graham.....	Frank Pyott, Tip Top.....	
Tri-State Med. Assn.....	C. C'H. Laughinghouse, Greenville, N. C.	Jas. K. Hall, Richmond, Va....	Greenville, S. C., Feb. 1924.
Valley Med. Society.....	J. M. Emmett, Clifton Forge....	A. F. Robertson, Staunton....	May and September.
Va. Soc. O.-L. & Oph.....	E. G. Gill, Roanoke	E. U. Wallerstein, Richmond..	Richmond, April, 1923.
Walter Reed Med. Soc.....	Rea Parker, Smithfield.....	L. E. Stubbs, Newport News..	Semi-annually
Warren-Rappahannock-Page Co. Med. Soc.	Giles B. Cook, Front Royal	L. C. Haynes, Flint Hill	
Warrenton Med. Soc.....	S. Harnsberger, Warrenton....	W. B. Carr, Warrenton....	
Warwick Co. Med. Soc.....	C. B. Courtney, Newport News..	A. D. Ownbey, Newport News..	2nd and 4th Tuesdays.
Vise Co. Med. Soc.....	W. G. Painter, Big Stone Gap ..	C. B. Bowyer, Stonega.....	Bi-Monthly.



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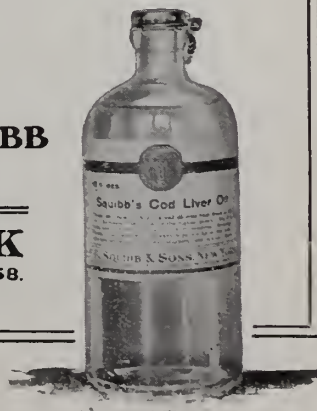
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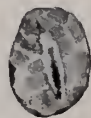
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- (1) Z. Zsigmondy—Anal. Chem. 40 (190), 697; Beitr. Physiol. Path. Chem. No. 3 (1903), 137.
- (2) Drs. Moore and Krombholz, J. Physiol., 22 (1908), 54.
- (3) Dr. C. A. Herter ("Infantilism from Chronic Intestinal Infection").
- (4) Dr. Abraham Jacobi ("The Intestinal Diseases of Infancy and Early Childhood").

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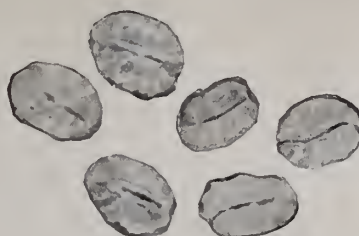
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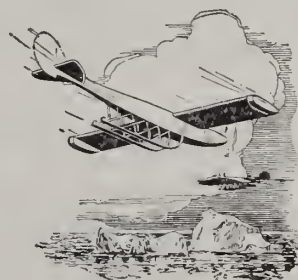
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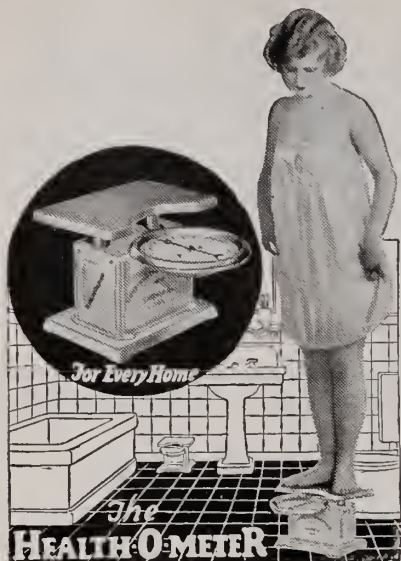
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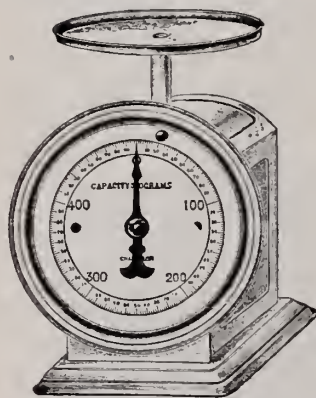
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Amelia Co. Med. Soc.....	P. T. Southall, Amelia	R. J. Styers, Amelia	
Arlington Co. Med. Soc.....	S. T. Noland, Clarendon	B. H. Swain, Ballston	1st Wednesday, May and November.
Augusta Co. Med. Assn.....	A. F. Robertson, Jr., Staunton	H. G. Middlekauff, Weyers Cave	
Bath Co. Med. Soc.....	R. A. Warren, Hot Springs	E. A. Pole, Hot Springs	
Bedford Co. Med. Soc.....	W. O. McCabe, Thaxton	J. A. Rucker, Bedford	
Botetourt Co. Med. Soc.....	E. W. Dodd, Buchanan	P. K. Graybill, Fincastle	
Buckingham Co. Med. Soc.....	J. H. Mitchell, Dillwyn	J. Randolph, Arvon	
Charlotte Co. Med. Soc.....	C. W. Tucker, Drakes Branch	W. R. Martin, Charlotte C. H.	
Danville Acad. Med.....	C. B. Pritchett, Danville	Saml. Newman, Danville	
Dinwiddie Co. Med. Soc.....	C. S. Do'd, Petersburg	W. C. Powell, Petersburg	
Eliz. City Co. Med. Soc.....	G. W. McAllister, Hampton	W. E. Knewstep, Hampton	
Fairfax Co. Med. Soc.....	C. A. Ransom, E. Falls Church	W. P. Caton, Fairfax	
Floyd Co. Med. Soc.....		R. T. Akers, Alum Ridge	
Frederick-Clarke Co. Med. Soc.	R. C. Randolph, Boyce		
Fredericksburg Med. Assn.....	R. Dew, Woodford	J. N. Barney, Fredericksburg	
Greensville Co. Med. Soc.....	G. B. Wood, Emporia	M. H. Tredway, Emporia	
Isle of Wight Co. Med. Soc.....	Rea Parker, Smithfield	E. M. Easley, Rushmere	
Jas. City Co. Med. Soc.....	J. M. Henderson, Williamsburg	D. J. King, Williamsburg	
Lee Co. Med. Soc.....	C. C. Pearce, Pennington Gap	P. D. Pence, St. Charles	
Loudoun Co. Med. Soc.....	J. B. Hackley, Purcellville	W. D. Sydnor, Hamilton	1st Wednesdays, Monthly.
Louisa Co. Med. Soc.....	F. J. Kellam Mineral	H. S. Daniel, Louisa	
Lunenburg Co. Med. Soc.....	Edwin Mann, Kenbridge	Robt. Whitehead, Meherrin	
Lynchburg & Campbell Co. Med. Soc.	F. O. Plunkett, Lynchburg	R. D. Caldwell, Lynchburg	
Mathews Co. Med. Soc.....	C. M. Raines, Bohannon	C. C. White, Mathews	
Mecklenburg Co. Med. Soc.....	W. M. Wilkinson, La Crosse	H. M. Snead, South Hill	
Med. Soc. Va., Md. & D. C.	W. J. Mallory, Washington	D. C. J. D. Rogers, Washington	May and November.
Med. Society of Va.	W. W. Chaffin, Pulaski	Agnes V. Edwards, Richmond	Staunton, October 14-17, 1924.
Nansemond Co. Med. Soc.....	H. H. Hunter, Whaleyville	C. F. Griffin, Suffolk	
Nelson Co. Med. & Surg. Soc.....	H. G. Dickie, Massies Mill	J. F. Thaxton, Tye River	
Norfolk Co. Med. Soc.....	C. W. Doughtie, Norfolk	Lockburn Scott, Norfolk	Norfolk, Weekly.
Northampton Co. Med. Soc.....	G. Fred Floyd, Bridgetown	J. M. Lynch, Cape Charles	
Northern Neck Med. Soc.....	M. C. Oldham, Lancaster	R. E. Booker, Lottsburg	
Nottoway Co. Med. Soc.	W. T. Warriner, Crewe	J. R. Adams, Blackstone	
Patrick-Henry Med. Society	J. A. Shackelford, Martinsville	G. B. Dudley, Jr., Martinsville	Bi-monthly.
Petersburg Med. Faculty	J. D. Willcox, Petersburg	J. M. Harwood, Petersburg	3rd Thursdays.
Piedmont Medical Society	E. D. Davis, Stanardsville	L. Holladay, Orange	
Pr. Edward Co. Med. Soc.....	J. Weldon Smith, Farmville	Susan W. Field, Farmville	
Pr. Geo. Co. Med. Soc.....			
Pr. Wm. Co. Med. Soc.....	T. G. Brown, Gainesville	W. F. Merchant, Manassas	
Rchd. Acad. Med	Fred M. Hodges, Richmond	M. W. Peyser, Richmond	2nd and 4th Tuesdays.
Roanoke Academy of Medicine	H. B. Stone, Roanoke	M. A. Johnson, Roanoke	1st and 3rd Mondays.
Rockbridge Co. Med. Soc.....	Robt. Glasgow, Lexington	B. W. Switzer, Lexington	
Rockingham Co. Med. Soc.....	J. E. Lincoln, Lacey Springs	A. C. Byers, Harrisonburg	
Seaboard Med. Assn.....	Wm. E. Warren, Williamston	C. P. Jones, Newport News, Va.	Rocky Mount, N. C., Dec. 1924.
Shenandoah Co. Med. Soc.....		F. C. Downey, Edinburg	
Southampton Co. Med. Soc.....	S. J. Railey, Handsom	R. L. Raiford, Sedley	
So. Piedmont Med. Soc.....	P. W. Miles, Danville	G. A. Stover, South Boston	April and November.
Southside Va. Med. Assn.....	Geo. H. Reese, Petersburg	R. L. Raiford, Sedley	March, June, Sept., Dec.
Southwest Va. Med. Soc.....	S. S. Gale, Roanoke	Elbyrne Gill, Roanoke	May and September.
Surry Co. Med. Soc.....	W. W. Seward, Surry		
Sussex Co. Med. Soc.....	T. M. Raines, Wakefield	C. P. Neblett, Waverly	
Tazewell Co. Med. Soc.....	P. D. Johnston, Tazewell	Isaac Peirce, Tazewell	
Tri-State Med. Assn.....	C. O'H. Laughinghouse, Greenville, N. C.	Jas. K. Hall, Richmond, Va.	Greenville, S. C., Feb. 1924.
Valley Med. Society.....	J. M. Emmett, Clifton Forge	A. F. Robertson, Staunton	May and September.
Va. Soc. O.-L. & Oph.....	E. G. Gill, Roanoke	E. U. Wallerstein, Richmond	Richmond, April, 1923.
Walter Reed Med. Soc.....	Rea Parker, Smithfield	L. E. Stubbs, Newport News	Semi-annually
Warren-Rappahannock-Page Co. Med. Soc.	Giles B. Cook, Front Royal	L. C. Haynes, Flint Hill	
Warrenton Med. Soc.....	S. Harnsberger, Warrenton		
Warwick Co. Med. Soc.....	C. B. Courtney, Newport News	A. D. Ownbey, Newport News	2nd and 4th Tuesdays.
Wise Co. Med. Soc.....	F. S. Givens, Wise	C. B. Bowyer, Stonega	Bi-Monthly.

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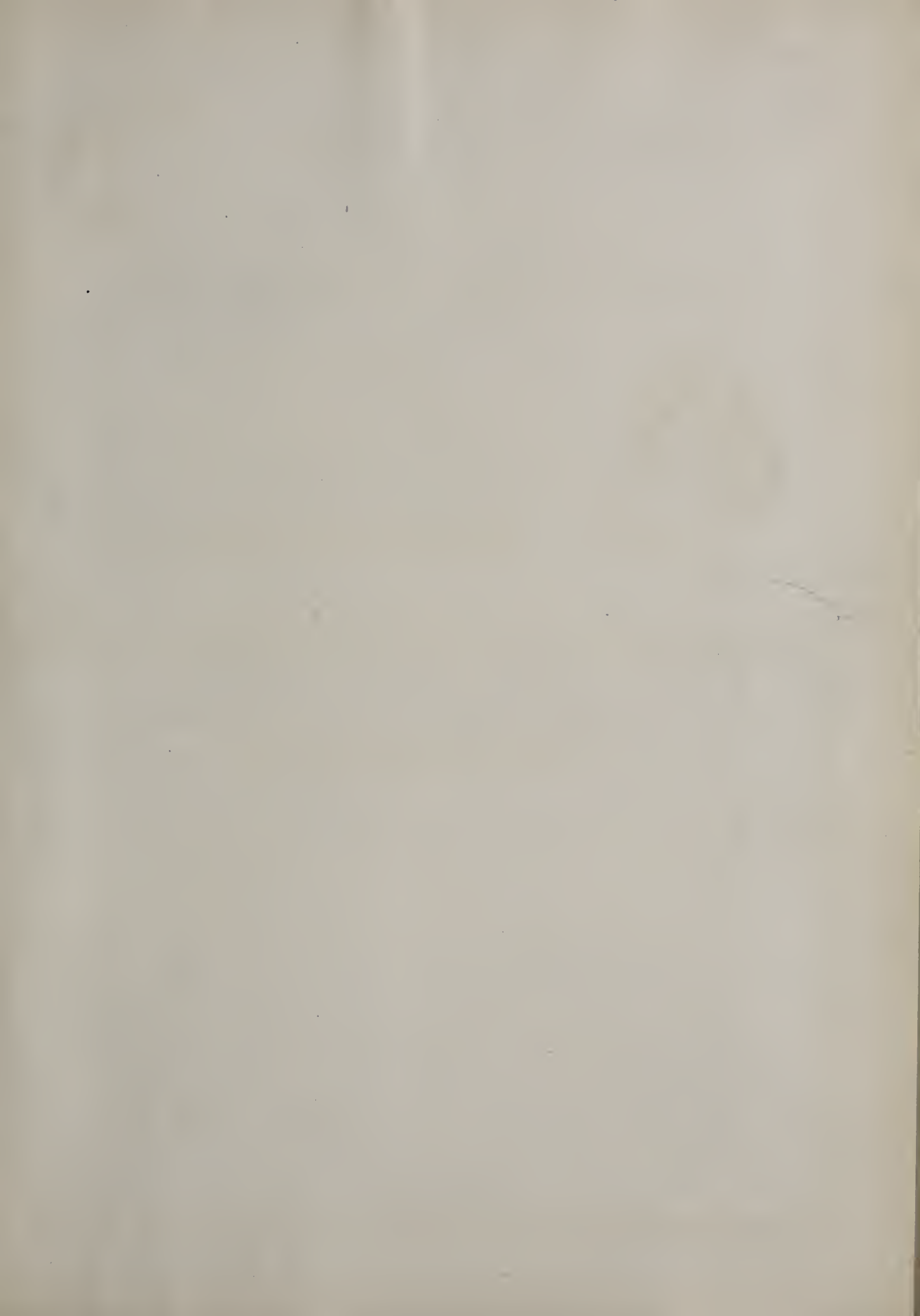
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